THE UNIVERSITY OF ALBERTA

AN ANALYSIS OF THE RESPONSIVENESS OF PUBLIC EDUCATION

FINANCIAL SUPPORT OF ECONOMIC GROWTH IN THE

PROVINCES OF CANADA 1930 - 1966 AND THE

IMPLICATIONS FOR THE FINANCING OF

EDUCATION IN THE DECADE

1971 - 1981

by

Ⓒ BRIAN SHARPLES

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "An Analysis of the Responsiveness of Public Education Financial Support to Economic Growth in the Provinces of Canada 1930 - 1966 and the Implications for the Financing of Education in the Decade 1971 - 1981" submitted by Brian Sharples in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

ABSTRACT

The purpose of this study was to examine and analyse
(1) the effect of changes in economic growth of each
province during the years 1930-66 on per capita educational
expenditures, assessed real property values, property tax
revenues and provincial grants, (2) the effect of changes in
provincial revenue sources on provincial education grants,
and (3) changes in effective property tax rate. The factors
used to represent economic growth were disposable income per
capita and population. Data for the analysis were obtained
from various provincial and federal government publications.

The basis for the analysis of this data was the
economic concept of elasticity which describes by means of a
coefficient the relative change of a dependent variable
compared to the corresponding change of associated
independent variables. Using time-series data, elasticity
coefficients were derived by means of stepwise multiple
regression analysis. The derived coefficients represented
an average value which summarized the changes in the
variable concerned for a number of years.

The effect of changes in economic growth on the
demand for education varied from province to province as
well as between time periods. However, most elasticities
approached or were greater than unity which indicated a
sensitivity of per capita educational expenditures to
changes in population and per capita disposable income. One

overall pattern that did emerge in this part of the study
was the greater dependence of the Demand for Education, in
all provinces, on population growth.

Several areas of concern with respect to the revenue
sources were examined and a number of findings were made.
First, property tax revenues have not kept pace with the
demand for public education because the property tax base
has not been as sensitive to changes in economic growth as
per capita educational expenditures. As a consequence, the
national effective property tax rate has increased 100 per
cent from 1930 to 1936. Second, elasticities of property
tax revenues tend to be less than those of the provincial
education grants. Therefore, if the tax rate remains
unchanged the proportion of the total yield provided by
property tax revenues will automatically diminish. Thirdly,
federal grants do not provide a much greater degree of
financial relief for education to the poorer provinces than
to the wealthier ones. Fourth, of the basic provincial
revenue sources, provincial education grants are most
sensitive to sales and direct taxes and least sensitive to
non-tax revenues. Fifth, provincial education grants do not
act as a substitute source of funds for education but rather
encourage an extended use of property tax revenues.

To conclude the study, a method of fiscal planning by
which elasticities may be used to predict future demand for
education and its financial support under differing
conditions of economic growth was presented.

ACKNOWLEDGEMENTS

The writer wishes to express his appreciation to those who assisted him with the study. In particular, Dr. P. J. Atherton, committee chairman and advisor, who gave helpful advice and direction throughout the project. Also Dr. E. J. Hanson, who offered helpful suggestions especially during the planning and final stages of the thesis. It would be remiss of the writer to neglect to express his sincere gratitude to his wife, Ellen.

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CHAPTER I

STATEMENT OF THE PROBLEM

I. INTRODUCTION

During the period 1956 to 1965 public expenditures
for elementary and secondary education across Canada rose
from $649 million to more than $2 billion (D.B.S., Survey of
Education Finance, 1969, p. 35). Though this rate of
growth in educational services was substantial, all regions
did not participate to the same degree. One major reason
for the existence of regional disparities is that although
education is a provincial responsibility, the provinces have
never possessed identical levels of available economic
resources to meet this commitment. Thus, the analysis of
the expansion of public education in each province, either
of the past or for the future, must be conducted within the
framework of the growing economy of the provinces (Hanson,
1969, p.2).

In the past, studies of this nature have been
restricted to a search for economic determinants to explain
inter-regional variations in educational expenditures (Miner,
1963, Paterson, 1967). Such studies have tended to avoid
analysis of the revenues that make such expenditures
possible. However, in more recent years, the substantial
growth in the level of educational expenditures has focussed
attention on the ability of present revenue sources to
support rising expenditures on public education in the

future. In order to predict revenues for public education it is necessary to examine the responsiveness of previous revenues to changes in certain economic growth and policy variables. If any trends appear, then they may be used to predict future revenues. To date no studies of this nature appear to have been attempted in Canada.

Therefore, the intent of this study is to assess the ability of the present forms of financial support for public education in each province to meet increased expenditures in the future. To perform this analysis it is necessary to derive equations which provide a means of determining a relationship between economic growth and operating revenues. In developing these equations by multiple regression analysis it is assumed that the independent variables which determine the amount of operating revenues interact with one another. Thus, the effects of a change of one independent variable depend on the value of the other independent variables as well as on the size of the change. When such an assumption is made the regression coefficients of the equation are measures of elasticity.

II. THE CONCEPT OF ELASTICITY

The elasticity coefficient is often used by economists as a measure to describe an association between two economic variables.[1] This coefficient is essentially a

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[1] For a more adaquate description of the concept of

ratio of the relative change of one variable and the
corresponding change of the other variable in the relation
being considered (Leibenstein, 1960, p.51). The most common
application of the concept is to express the change in the
demand for a good with respect to a corresponding change in
the price of the good or in the income of the consumer.
Since 1950 increasing use has been made of elasticities
for measurements within the public sector of the economy as
is evidenced by the studies noted in Chapter II.

When the quantity demanded of a good is a function of
more than one independent variable, partial elasticities may
be derived. Each partial elasticity is a measure of the
responsiveness of the dependent variable to changes in the
independent variable with which the partial elasticity is
associated, assuming the other variables remain constant.
Such elasticities are used in examining the responsiveness
of the educational revenues to specified economic variables.

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III. STATEMENT OF THE PROBLEM
AND SUB-PROBLEMS

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Problem

The problem that the study is designed to investigate
is presented in the form of two questions:

1. What has been the responsiveness of the systems

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elasticity and its application the reader is referred to the
following authors: Benson, 1966, Brennan, 1965, and
Leibenstein, 1960.

of financial support of public education in each
province in the past to changes in the level of
economic activity?

2. How might such economic activities affect the
    ability of revenue sources to meet increased
    educational expenditures anticipated in the next
    decade?

Sub-Problems

To facilitate the study it is necessary to examine a
number of sub-problems which are outlined below:

1. What were the income and population elasticities
    of public education over selected time periods
    between 1930 and 1956 at both a provincial and
    national level?

2. What was the responsiveness of the property tax
    revenues to changes which occurred in the levels
    of disposable income per capita, population, and
    provincial grants for public education between
    1930 and 1966 on both a provincial and national
    level?

3. How responsive were the property tax base and
    provincial education grants to changes in the
    level of personal disposable income and popula-
    tion during the same period?

4. What was the trend of the property tax yield when
    expressed as a percentage of the estimated market

value of **real** property?

5. What was the responsiveness of provincial public
    education grants to changes in the levels of
    sales tax, provincial share of income tax
    revenues, federal grants-in-aid to provinces and
    provincial non-tax revenue sources in the years
    1930 to 1966?

6. What are the estimates of educational expenditures
    and the measures of economic activity to be used
    in the study for the next decade?

IV. DELINEATION OF THE STUDY

Assumptions

In order to conduct this study, it is necessary to
make the following assumptions:

1. The amount of revenues made available for public
    education are directly dependent on economic
    progress.

2. An interaction exists between the measures of
    economic activity to be used in this study.

3. The level of educational expenditures per captia
    is a direct measure of the quantity of service
    provided and is indicative of the willingness of
    the individuals to support public education.

4. The supply of both taxed and untaxed consumption
    goods may be highly elastic.

In making economic predictions based on past trends it is necessary to formulate a number of assumptions regarding the future economic, social, and political conditions of the country. Generally, these assumptions are based on a gradual and uniform development of the national economy. For this study, the predictions rest on the acceptance of the following assumptions:

6. No major war or economic recession will occur in the next ten years which will involve Canada.

7. The economic growth of the country over the next ten years will be substantial with very mild cyclical movements.

8. Projections of expenditures and revenues for public education will exhibit a gradual overall increase.

Limitations

Any study of this nature which is dependent on accruals of data derived under varying conditions, rather than the results of a well designed experiment, is subject to a number of imperfections and uncertainties. Thus, the reliability of the results of the analysis is dependent to some degree on the accuracy and availability of the data which are used. In particular, data on market value of real property are a major limitation because the assumptions made in the study of the estimates of market value may be criticized.

This study is also limited to an examination of aggregate data at the provincial and national levels which is available from provincial and federal sources. As a consequence, the estimates of elasticities that are calculated, do not take into account differences at the school system level. Therefore, application of the findings to individual school districts is unjustified without additional analysis.

A further limitation relates to the use of the regression equation approach which is used in deriving estimates of various income elasticities from time-series data. This procedure is most appropriate for data having a uniform variance of deviations from the fitted regression line, few extreme deviations, or deviations that are independent of one another. With observations that are taken at ordered points in time these conditions are seldom strictly satisfied since such observations cannot be treated as random (Quenouille, 1952, p. 52).

Finally, the extensive use of variables, expressed as ratios, limits the interpretation of the magnitude of the actual changes in the variables under consideration as a ratio only indicates the magnitude of one variable compared with another. Since the magnitude of the ratio is affected by the numerator as well as the denominator then both parts of the ratio must be considered in the interpretation of the ratio.

Delimitations

This study is delimited to an examination of the elasticities of educational expenditures and revenues in each province of Canada and at the national level for the calendar years 1930 to 1966. The Yukon and North West Territories are not included at the national level in this study.

Certain delimitations are also necessary with reference to the variables employed. For example, educational expenditures include annually recurring expenditures but other expenses such as capital expenses which occur infrequently are omitted. With respect to educational revenues the study considers only those revenues derived from the property tax and provincial grants-in-aid.

Though it is realized that many variables may be used as measures of economic activity the study delimits these to factors of economic growth and taxation as described in Chapter III.

V. NEED FOR THE STUDY

Constitutionally the provision of education is the responsibility of the provinces but in the past each province has shared, to varying degrees, the onus of financing elementary and secondary education with local levels of government. As a consequence, of the two major sources of public education revenues, provincial grants-in-aid and the property tax, the latter has been traditionally

held as the almost exclusive source of revenues for public education. In recent years, one of the more pressing problems facing school boards has been the apparent inability of the property tax or unwillingness of taxpayers to provide the necessary funds for rising expenditures in public education.

Many explanations have been offered to account for the perceived demise of the property tax but on close inspection these explanations seem to polarize about two basic factors. Some experts maintain that the revenue generated by the property tax has reached, or is approaching a ceiling, and that additional revenues must be provided by alternative sources (Clayton, 1966, p. 132). Whether or not such a limitation is due to political or economic factors has not been ascertained. The other explanation commonly offered is based on the growth rate of the tax base. Some observers have suggested that the growth rate of the property tax base has been consistently lower than the general economic growth of the country with the result that the revenue productivity of the tax has decreased (Clayton, 1966, p. 132). Whatever reason may be offered for the alleged inadequacies of the property tax as a revenue source there is at least one definite implication. This implication is the feeling that the property tax revenues lack the necessary degree of elasticity to meet the growing demands for public education which have been placed on them

(Robinson, 1968, p. 156). Much of what has been stated above is basically opinion and therefore lack any substantiation by research. However, this study is directly concerned with the validity of some of these statements.

The consequence of this seeming disparity in revenues of the property tax and responsibilities has been that the school boards have had to seek funds from the provincial governments. Evidence of the acceptance of this consequence is readily available in the statistical information on the financing of public education. Between 1954 and 1966 the proportion of educational revenues supported by the provinces in Canada increased from 35.6 per cent to 50.3 per cent (Brown, 1969, p. 41). Thus, public education must increasingly compete with various other services such as transportation, communication, health and welfare at the provincial level. McLure has suggested that this situation has been, and will continue to be, to the detriment of education since the direct or immediate benefits of education are not readily perceived (McLure, 1967, p.66). Examination of the responsiveness of the provincial education grants to changes in the levels of provincial tax revenues will determine to some degree the concern for public education at the provincial level.

An analysis of the past performance of the revenue sources of public education to fluctuations in the levels of certain measures of economic activitiy is sufficient justification for the study. However, the study is

incomplete without giving some consideration to the future
yield of the two basic revenue sources for education as it
has a direct bearing on the future fiscal policy for public
education.

VI. DEFINITION OF TERMS

Though most of the terms are defined when introduced
into the study a list of the major terms together with a
brief definition of each one is given below for purposes of
convenience.

Assessed value of property. The value assigned to
real property for taxation purposes.

Economic growth. A term used to describe the
expansion of a region's output of goods and services. This
output may be measured in terms of the growth of aggregate
income in that region.

Educational expenditures. The total operating
expenditures which include expenses for administration,
instructional aids and supplies, instructional salaries,
auxiliary services, plant operation and maintenance,
transportation of students, debt services, and miscellaneous
factors. The expenditures incurred for capital construction
are omitted.

Elasticity. A ratio of the relative change of one

variable and the corresponding change of the other variable in the relation being considered.

Elementary and secondary education. Terms used in accordance with the levels of education defined by the Dominion Bureau of Statistics. Elementary level of education is defined as Grades I to VIII and the secondary level of education is considered to be Grades IX to XII inclusively.

Estimated market value of real property. The price which a property would bring on the open market in a free sale between a willing buyer and a willing seller. A number of synonyms frequently employed include: true value, true market value, true cash value, fair cash value, and actual value.

Expenditures in constant dollars. A term used to refer to the monetary value of expenditures which takes into account the changing purchasing power of money as reflected by changes in price indexes. The term "constant" is used to refer to the purchasing power of money in the base year of a price index series.

Expenditures in current dollars. A term used to refer to the monetary value of expenditures without giving consideration to the influence of changing price levels.

Income elasticity of public education. A measure of

the willingness of the individual to support public education by means of comparing the percentage change of educational revenues or expenditures per capita with the corresponding percentage change in income per capita.

Partial elasticity. A measure of the change in the dependent variable with respect to the change in one of the independent variables when the quantity of a good demanded is expressed as a function of more than one variable; the remaining variables being held constant.

Personal income. All income received by Canadian residents and includes: wages and salaries, military pay and allowances, transfer payments received by individuals, investment income, net income received by farm, and non-farm unincorporated operators.

Personal property tax base. Generally consists of personal property of a tangible nature which is not included as property in the definition of real property. Such items as household furniture, movable property, goods, wares, and merchandise may be included in the definition.

Real property tax base. Those things which can be owned and are generally considered to be normally fixed or immovable. This base includes items such as land, buildings and all structures or fixtures erected on the

land and is expressed in "value" terms (i.e. dollars) rather than in "unit" terms (i.e. acres).

Tax rate. Determined for the property tax by dividing the revenue to be raised from the tax by the assessed valuation of the taxing unit.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

I. INTRODUCTION

This chapter briefly reviews some of the major empirical studies and other related literature which deal with the application of the elasticity concept to the property tax and current expenditures in public education. The major portion of the studies examined were conducted in the United States and though there are striking similarities between the tax systems of the United States and Canada, it cannot be assumed that the values of elasticity coefficients reported in the American studies are directly applicable to this country. The major reason which prevents the use of such data in Canada is that the elasticities of both educational revenues and expenditures are affected by the amount of personal income funnelled into taxes or education which is dependent on a number of factors:

1. the composition and distribution of incomes within a province or country.

2. the pressure of the needs for expenditures.

3. the strength of the groups expressing these needs.

4. the basic social philosophy of the province or country.

5. the responsiveness of the particular government to political forces which may urge higher

expenditures or favour leaving more resources in
the private economy (Burkhead, 1963, p. 88).
Thus, at the outset it must be realized that the ratio of
tax revenues or educational expenditures to personal income
is a measure of responsiveness which is subject to many
varied economic and social forces which are seldom identical
for two or more communities or regions.

II. INCOME ELASTICITY OF THE PROPERTY TAX

A major criticism often levelled against the property
tax is its relative insensitivity to change. Barr (1960,
p. 122) expresses the problem in the following manner:

> The principal inequity of the property tax is its
> relationship to income. If property taxation were made
> more flexible, so that the tax revenue could fluctuate
> with economic conditions, there would be fewer changes in
> inequity.

A report on education given by the Rockefeller
Brothers' Fund asserted that all the problems of schools
lead back sooner or later to a basic problem of finance.
This lack of financial support for public education was
attributed partly, according to the report, to the excessive
dependence on the property tax for school revenues. A tax
which is "notably laggard in its response to rising income"
(Rockefeller Brothers'Fund, 1958, p. 33). An explanation of
this lack of sensitivity of the property tax to changes in
personal income was forwarded by the Educational Policies
Commission of the United States:

> The most serious disadvantage, however, is that the

value of the property may bear little relation to the
income of the owner, yet most individuals pay taxes out
of income. In the first place, much real property
produces little or no direct income. Secondly, as the
economy grows, the value of real estate in any area may
not grow proportionately - with income- (National
Education Association, 1959, p. 19).

Despite a willingness on the part of many individuals
and groups to condemn the property tax for its lack of
responsiveness to changing economic conditions, a search of
the literature reveals a paucity of empirical work,
particularly in Canada, dealing directly with this alleged
insensitivity of the property tax. The earliest and most
frequently quoted study which examined the stability of taxes
at both the state and local levels was conducted by Groves
and Kahn in 1952. In this pioneering study, the investi-
gators employed a simple regression equation to calculate the
income elasticities of a number of taxes used in several
states, including the property tax in Wisconsin (Groves &
Kahn, 1952, pp. 87-102). The income elasticity of the
property tax which was based on tax yields from the assessed
property values and the state personal income between the
years 1929 to 1948 was found to be 0.22.

At the time of the study, considerable emphasis was
placed on the stability of state and local taxes in order
that public services offered by these levels of government
would not be adversely affected by lack of revenues if grave
fluctuations were to occur in the economic cycle. Thus, the
authors were particularly interested in taxes which had low
income sensitivity. In their opinion, the property tax

satisfied this criterion since its estimated elasticity of 0.22 ensured that the tax could provide a substantial revenue which would be sustained at a fairly constant level even in deflationary periods.

However, this conclusion was tested in an analysis of the revenue requirements for a hypothetical large city in which a number of tax systems were used including one based solely on the property tax. The other systems consisted of various combinations of property, sales and income taxes (White & White, 1954, pp. 17-39). For part of the analysis, the 0.2 estimate for the property tax elasticity derived by Groves and Kahn was used. The results indicated that a system based solely on the real property tax would have only a relatively mild advantage in a depression and overwhelming disadvantages in all periods in which economic growth occurred. The authors in their conclusion stated: "assuming a practical program of surplus carry-over can be worked out, it is clear that adoption of high elasticity (cycle sensitive) taxes by municipalities is to be encouraged" (White & White, 1954).

Blank, in a critical evaluation of the Groves-Kahn estimate of the elasticity of the property tax observed that the value was derived in a time period characterized by an abnormally low level of private capital accumulation (1954, pp. 323-326). The limited responsiveness of the assessed value of real property to the growth in the gross national product was attributed to two major factors. In the first

case, the periods of time used by Groves and Kahn were marked by a very low volume of construction except for three post war years. Secondly, during the war and the immediate post war years, assessments lagged far behind the rise in price levels for real property. The author concluded that, in view of the volume of construction being undertaken in the 1950's and the growing awareness of the need for continuous updating of real property assessments, the Groves-Kahn coefficient would be much too low for use in forecasting the revenue-productivity of the real property tax.

In an attempt to estimate the financial resources of state and local governments in the 1960's, Netzer derived a value of unity for the income elasticity of the property tax (1958, pp. 317-327). The contrast in magnitude between this value of the elasticity and the one quoted previously arises from the variables used to calculate the coefficient and the time periods for which data was collected. Netzer in his estimate of the property tax elasticity used changes in the Gross National Product and the estimated market value of real property for the years 1946 to 1957 whereas Groves and Kahn employed changes in tax revenue and aggregate state income during the years 1929 to 1948. Lampman, in a similar analysis of future governmental spendings and revenues concluded that an average elasticity of 1.2 for the property tax could be expected during the decade of the 1960's (1961, pp. 7-17). This estimate was based on property tax data from Wisconsin for the post war period 1945 to 1955. During

this decade the ratio, based on changes in tax revenue and the Gross National Product varied from a high of 1.8 to a low of 1.2 (Penniman, 1956, p. 333). The elasticity coefficients derived by Mushkin using the relative movements of the full values of real property and personal income of five states for the period 1948 to 1955 ranged from 1.7 to 2.0 (1961, pp. 74-77).

One of the more comprehensive analyses of the property tax was made by McLoone (1961) for his doctoral thesis. The variables used in his estimates of the elasticity coefficient of the tax base, for the period 1929 to 1957, were the relative changes in the Gross National Product and the estimated market value of the real property. The changes in the market value of the real estate were principally based on Goldsmith's data of the estimated wealth of the United States.

Though it was observed that the overall value of the elasticity coefficient approached 1.0, it was concluded that a coefficient of 0.8 would be more reasonable for projections in the 1960's (McLoone, 1961, pp. 70-76). Further to the study, McLoone examined separately residential property, agricultural realty and non-farm business realty subject to a property tax. For residential property, he maintained that a value of 1.2 for the income elasticity of this base would be consistent with general long term economic trends whereas lower values should be expected for the other categories. Because it had been observed that agricultural

income rose less rapidly than other incomes, in the time period under examination, McLoone projected a coefficient value of 0.4 for agricultural realty. For business realty, 0.6 was indicated as the most appropriate value for its elasticity coefficient.

As part of the Syracuse University Project for Research in Educational Finance, an examination of the elasticity of property tax revenues was conducted with the purpose of finding an explanation of differential rates of increase of tax revenues that occur from region to region (Burkhead, 1963, pp. 49-70). For this particular study, data was collected from 57 counties in New York state for the years 1949 to 1959. The elasticity coefficients, which were estimated by use of a regression equation, ranged from a low of 0.89 to a high of 3.37. The median value for the coefficient was found to be 1.61 while the mean value for all the counties was 1.67.

In the multiple correlation analysis of a number of independent variables which were considered to be determinants of elasticity, Burkhead found that the only variables which were of a positive significance were: (1) percent increase in population, (2) percent change in ratio of population over 65 years to total population, (3) percent change in ratio of public school average daily attendance to total population, and (4) percent increase in the full value tax rate. Two other variables, average per capita income and per capita non-property taxes, exhibited a negative

relationship to the income elasticity of property tax revenues.

Further to the study, Burkhead also undertook a cross-section analysis of the elasticity of the property tax revenues of counties in six selected states including New York. For this part of the study 1957 data was used and a somewhat different picture emerged. The mean elasticity for each of the six states was almost identical, ranging from 0.55 in Michigan to 0.63 in Colorado. However, it was substantially lower than the value of 1.67 derived from the use of time-series data for New York state. An examination of the relationship between the tax elasticities derived for the six states and the same selected socio-economic determinants used in the first part of the research revealed that the influence of these factors varied widely from state to state. For example, per capita effective buying power and local non-property taxes were important explanatory variables in only three states, and the full value tax was associated with elasticity in five of the six states but population size had a widely varying effect on elasticity. Thus, Burkhead concluded: "property tax elasticity would appear to respond to a different pattern of influences within each state" (1963, p. 70).

To aid in the formulation of tax and expenditure policies of governments; accurate forecasts of the growth of the tax base over time are required. A method often employed is the income-elasticity approach which is an indirect

approach that involves forecasting the elasticity of the tax base. However, the elasticity of the property tax base is subject to a number of factors which include the following: the method of valuation of property, the time period under study, and the size of the region considered. To examine the possible effect of these variables on the coefficient, Bridges (1964, pp. 253-264) conducted a study in which comparisons were made of the coefficients of the income elasticity of the tax base determined under the conditions defined below:

1. property value based on both market and assessed values of real property.

2. for postwar and prewar time periods.

3. at national, regional and state levels.

The various estimates of the value of real property were derived from the Census of Governments, Goldsmith's estimates of the market value of real and personal property, and Newcomer's estimates of assessed values for real and personal property. The Gross National Product was used as the income variable.

The computed elasticities differed markedly from area to area with the market value coefficient of the tax base being greater than or equal to unity in the years since World War II. For the nation as a whole, Bridges found that in the 1956 to 1961 period, the property tax base had a market value elasticity of 1.5 and an assessed value of 1.2. Regional values based on assessed property, for the same

time period, ranged from 0.5 in the Plains region to 1.6 in
the Southeast. The market value elasticities were somewhat
higher and ranged from 0.9 in the Southwest to 1.9 in the
Great Lakes area. Interstate differences in both assessed
and market value elasticities ranged from less than 0.5 to
2.5. However, the market value elasticities are of
questionable validity because the assessment - sales ratios
used were subject to considerable sampling variability.

Over the time period 1899 to 1957, the elasticity for
the nation varied depending on the particular era and the
length of the time period selected. For the time periods
1948 to 1957, 1948 to 1953, and 1953 to 1957, the market
value elasticities of the property tax base were 1.0, 0.9,
and 1.4 respectively. The market value elasticities for
selected time periods before World War II were 0.9 and 1.2
for the years 1899 to 1929, and 1927 to 1938 respectively.
The average market value elasticity at the national level
for the period 1899 to 1957 was found to be 0.9.

In his conclusion, Bridges assumed that the
elasticity of the tax base (market value) would be close to
unity for the decade beginning 1964. In other words, the
average annual percentage increase of the tax base over
these ten years would be approximately equal to the
percentage increase in the Gross National Product. However,
this inference cannot be applied indiscriminately because of
marked fluctuations that may exist in elasticities from
region to region. As a consequence, Bridges expresses the

need for the development of better techniques that may be
used to forecast the development of the property tax base.

As part of a study of local finances in Iowa,
estimations were made of the income elasticities of four
categories of property tax levies using personal income and
tax revenue data for the years 1910 to 1960 (Wright &
Marker, 1963, pp. 274-291). The computed values of the
elasticities were:

Category	Elasticity
Net levies of all local units	0.86
Muncipal levies	0.97
School levies	0.93
County levies	0.69

The variations in the elasticity coefficients were primarily
attributed to differences in the patterns of state aid given
to the various types of local government. This conclusion
was based upon the fact that the counties which received
substantial financial support from the state did not need to
rely on the property tax to the same degree as other local
governments which received relatively little state aid.

Even though Wright and Marker indicated that
generalizations regarding the income elasticity of property
tax must await further research covering longer time periods,
they did conclude that the elasticity values for Iowa school
levies do provide some evidence of the potential revenue
productivity of the tax.

Although an examination of the revenue-productivity
of the property tax would be equally useful in Canada for

purposes of formulating tax and expenditure policy, only one study was located which considered in some detail the elasticity of the property tax. This study of the revenue-productivity of the property tax in Ontario included estimations of the value of the elasticity coefficient for successive quinquenniel periods between the years 1937 and 1961 (Clayton, 1966, pp. 137-140). The variables used to determine the coefficient were provincial personal income and the assessed or estimated market values of real property in Ontario. No matter which value of the real property was used, the income elasticity of the tax base showed an upward trend. However, the elasticity coefficient which was calculated from the estimated market value data was found to be consistently higher. The overall average values of the ratio for 1937 to 1961 were: 0.39 when the assessed value of the property tax was used and 1.1 in the other case. In conclusion, it was anticipated that the future elasticity would be greater than unity if based upon the estimated market value of the property tax.

In an effort to provide a summary of the pertinent estimates of the elasticity coefficient given in the studies cited above, Tables I and II were prepared. These tables include the estimated values of the income elasticity of the property tax and its base as well as a short description of the variables used and the time period from which the data were gathered.

TABLE I

COMPARISON OF VARIOUS COMPUTED INCOME ELASTICITIES OF THE PROPERTY TAX REVENUE

Investigator	Year or period selected	Coefficient of elasticity	VARIABLES USED	
			Revenue	Income
Groves and Kahn	1929-48	0.22	Tax yield from the assessed property value of the state	Wisconsin state aggregate personal income
Lampman	1945-55	1.2	Tax yield in Wisconsin	Gross National Product
Burkhead	1949-59	1.61-1.67	Tax revenue in New York state on county basis	Aggregate personal income on county basis
Burkhead	1957	0.55-0.63	Tax revenue of each of six states on county basis	Aggregate personal income for each of six states on county basis
Wright and Baker	1910-60	all units 0.86 municipal units 0.97 school units 0.93 county units 0.69	Tax revenues of Iowa state	Aggregate personal income of Iowa state

TABLE II

COMPARISON OF VARIOUS COMPUTED ELASTICITIES OF THE PROPERTY TAX BASE

Investigator	Year or period selected	Coefficient of elasticity	Tax base	Income
			VARIABLES USED	
Netzer	1946-57	1.0	Nationwide estimate of market value of real property	Gross National Product
Mushkin	1948-55	1.7-2.0	Estimated market value of real property in six states	Aggregate personal income of five states
McLoone	1929-57	Nationwide 0.8 / Agricultural Realty 0.4 / Business Realty 0.6 / Residential Realty 1.2	Nationwide estimate of market value of real property	Gross National Product
Bridges	1956-61	Nationwide 1.5	Est. market value of real property	Aggregate personal income
		1.2	Assessed value of real property	Aggregate personal income
		Regional 0.9-1.9	Est. market value of real property	Aggregate personal income
		0.5-1.6	Assessed value of real property	Aggregate personal income
	1899-1929	Nationwide 0.9	Est. market value of real property	Aggregate personal income
	1927-38	1.2	Est. market value of real property	Aggregate personal income
Clayton	1937-61	0.39	Assessed value of Ontario real property	Ontario aggregate personal income
		1.11	Estimated market value of Ontario real property	Ontario aggregate personal income

III. INCOME ELASTICITY OF EDUCATIONAL
EXPENDITURES

It is generally recognized that the demographic,
technological, and social changes occurring within the
country will necessitate an increase in expenditures for
public education in the future. However, when such trends
in spending are unrelated to independent economic variables
which seem to control the expenditures, they are not too
meaningful for purposes of projection. It therefore becomes
necessary to relate educational expenditures to some measure
of economic activity which acts as an indicator of future
trends. In each of the studies quoted below, the most
common economic indicator chosen as a significant determi-
nant of educational expenditures was personal income which
permitted estimates of income elasticities of these
expenditures to be made.

Fabricant's study in 1952 was one of the original
studies in which an attempt was made to explain variations
in the level of state and local expenditures (1952). Using
data derived from the 1942 Census of Governments, Fabricant
estimated the relationship of per capita personal income,
degree of urbanization, and density of population to total
expenditures per capita and to per capita expenditures of
ten functional categories in the 48 contiguous states. In
the category of public school expenditures, the elasticity
coefficients were found to be: 0.78, with respect to 1938 to
1942 average income per capita, -0.04, with respect to

urbanization, and -0.06, with respect to population density. From an examination of these values it would appear that one of the most important economic determinants of school expenditures is personal income, while urbanization and population density had no significant influence on the level of expenditures.

A further attempt to estimate the income elasticity of education was made by Brazer (1959) in his study of the determinants of city expenditures. In this phase of the study the income elasticity of education was estimated for the 40 largest cities in the United States. A value of 0.73 was obtained for the coefficient when 1949 median personal income and 1953 per capita educational expenditures were used in a cross-section analysis.

In a study to find the determinants which would explain the differences in per pupil expenditures for public education in 27 school districts located within the St. Louis City-County area, Hirsch observed a high correlation between the assessed valuation of real property and personal income (1960, pp. 29-40). Since data on assessed values were readily available, the author used this factor as a proxy for per capita income together with total current expenditures, including debt service, to calculate the income elasticity of various components of educational spending. A value of 0.56 was obtained for the coefficient when 1951-52 and 1954-55 data were used. When debt services were omitted the value of the coefficient fell to 0.52 and

an elasticity of 0.42 for instruction alone was found to be the lowest of all the categories of educational expenses considered.

Prior to this study, Hirsch analysed the historical growth of spending in elementary and secondary education using national aggregate time-series data for 17 selected years during the period 1900 to 1958. On the basis of total current expenditures plus debt service per pupil in average daily attendance and per capita personal income data, the overall national value of the income elasticity of educational expenditures for the period 1900 to 1958 was estimated to be 1.09.

In a doctoral study, McLoone determined the income elasticities of education for the nation as a whole as well as for each state in the four different time periods: 1929-30 to 1957-58, 1929-30 to 1943-44, 1943-44 to 1957-58, and 1947-48 to 1957-58. These estimates were derived from diachronic data of current expenditures per pupil in average daily attendance, excluding capital outlay and debt service and per capita personal income. The nationwide value for the coefficient was found to range from a low of 0.46 for the period 1929-30 to 1943-44 to a high 1.61 for the period 1943-44 to 1957-58. Over the total time period examined, 1929-30 to 1957-58, the nationwide elasticity was estimated to be 0.99 or almost unity.

Elasticities for individual states followed a similar trend to the coefficients calculated on the basis of the

aggregate data of the states. In particular, it was found that during the period 1929-30 to 1943-44 no state achieved an elasticity value greater than 0.74 whereas in the 1943-44 to 1957-58 period, all states had a coefficient greater than unity.

From a study which explored the relationship of total state personal income to total state expenditures for education in five selected states during the period 1946 to 1958 indirect estimates of the income elasticity of education were derived (James, 1961, pp. 72-76). Although the basic findings were reported in terms of regression coefficients, it was possible to calculate the income elasticities from the data. The approach used consisted of multiplying the particular regression coefficient by the ratio of the mean of state personal income to the mean of total state public education expenditures. These derived values of the elasticity coefficient varied from a low of 1.49 for New Jersey to a high of 2.12 for Nebraska and for all five states the coefficient was greater than one.

One phase of a cross section analysis of 1959-60 expenditure data for a nationwide sample of local school districts was concerned with the estimation of the income elasticity of educational expenditures in which different current expenditure variables were used (Miner, 1963, pp. 106-107). The sample consisted of 1,127 school districts from 23 states which had pupil enrollments of 300 or more. In general, the income elasticities were found to

be greater for per capita than for per pupil expenditures although all values were of a relatively low magnitude. Using state personal income per capita the following elasticities were obtained: (1) 1.15 for total current expenditures per capita, (2) 0.23 for total current expenditures per pupil.

Shapiro (1962) examined determinants of current public education expenditures per pupil in average daily attendance in a series of cross section analyses for 1920, 1930, 1940, and 1950 for the American states. One phase of the study included the calculation of the income elasticity of educational expenditures by a method similar to that of James. Personal income per capita and current expenditures per pupil in average daily attendance per pupil were the variables used in the ratio. The values obtained for the coefficient were 0.99 in 1920, 0.72 in 1930, 0.71 in 1940, and 0.91 in 1950 (Shapiro, 1962, p. 69).

Since studies of determinants of educational expenditures often include a section concerned solely with income elasticities of education it is interesting to note that one of the first examinations of this coefficient in Canada is to be found in such a study (Paterson, 1967, pp. 144-148). The main purpose of this study was to examine the determinants of current expenditures per pupil in average daily attendance in each of the ten provinces of Canada. The procedure used in computing the elasticities was identical to the method used by Shapiro in which the

income net regression coefficient produced in an earlier part of the study, was multiplied by a ratio of the mean value of personal income to the mean value of the current educational expenditures (in constant dollars). By this method, values for the coefficient were obtained for 1941, 1951, and 1961. In general the elasticities increased by small degrees from 1941 to 1961. The actual nationwide values of the income elasticity of educational expenditures were 0.93 in 1941, 0.99 in 1951, and 1.12 in 1961. Given the differences in data, definition, and time periods these findings are reasonably consistent with the findings of comparable United States studies.

Another Canadian study which provided estimates of income elasticity, but in this case for each of the Canadian provinces for the period 1951 to 1962, based the calculations on a linear regression between per capita personal income and either expenditures per pupil in average daily attendance or expenditures per capita (Atherton, February, 1968, pp. 28-32). The overall mean elasticity for per pupil expenditures was 2.2. The income elasticities based on per pupil expenditures ranged from a low of 0.41 for New Brunswick to a high of 2.90 in Ontario. The values of the ratio based on per capita expenditures were somewhat higher and fell between a minimum of 0.74 for New Brunswick and a maximum of 3.41 for Alberta. Though these values, on the whole, were substantially higher than equivalent values for the United States they do not necessarily reflect

greater willingness on the part of Canadian citizens to support public education. The author, in conclusion, indicated that factors such as the exclusion of federal transfer payments, non-tax sources of revenue and the inclusion of capital costs in the expenditure data would serve to distort the estimates of the elasticity coefficient.

Atherton (1968), in a subsequent study, estimated the income elasticity of education for the periods 1957 to 1960 and 1961 to 1965 in Alberta for the purpose of examining any effects which might have occurred due to the change made in 1961 in the system of financing education. In both cases, the coefficient was computed from data on personal income per capita in Alberta and expenditures on operations per weighted pupil enrolled in Alberta public schools. Prior to the adoption of a new system of financing the income elasticity was estimated to be 3.0 whereas subsequent to the change the coefficient fell drastically to 0.9. Thus, a decided change in the willingness of Albertans to support education occurred coincidentally with the introduction of a new method of financing education.

In keeping with the previous section Table III provides pertinent information regarding various studies which have included estimates of the income elasticities of educational expenditures. Included in the table is a short description of the variables used in calculating the coefficient by each researcher and the estimated values of the ratio.

TABLE III

COMPARISON OF VARIOUS COMPUTED INCOME ELASTICITIES OF EDUCATION EXPENDITURES

Investigator	Year or period selected	Coefficient of elasticity	VARIABLES USED	
			Education expenditures	Income
Fabricant	1942	0.78	Per capita expenditures from 1942 Census	U.S. per capita personal income, 1938-42 average
Brazer	1953	0.73	Per capita expenditures of 40 largest U.S. cities	Median income for 1949
Hirsch	1951-52 and 1954-55	0.56	Current expenditures including debt service of St. Louis City-County school districts	Assessed valuation of real property in St. Louis City-County school districts
Hirsch	Selected years 1900-58	1.09	Current expenditures including debt service per pupil in A.D.A., nationwide	Per capita personal income, nationwide
McLoone	1929-30 to 1957-58 1929-30 to 1943-44 1943-44 to 1957-58	0.99	Current expenditures per pupil in A.D.A., nationwide	Per capita personal income, nationwide
James	1946-58	1.49-2.12 depending on state	Total state expenditures in five selected states	Total state personal income in five selected states
Miner	1959-60	1.15 0.23	Current expenditures per capita Current expenditures per pupil	Personal income per capita Personal income per capita

TABLE III (continued)

Investigator	Year or period selected	Coefficient of elasticity	VARIABLES USED	
			Education expenditures	Income
Shaprio	1920 1930 1940 1950	0.99 0.72 0.71 0.91	Current expenditures per pupil in A.D.A., nationwide	Personal income per capita, nationwide
Paterson	1941 1951 1961	0.93 0.99 1.12	Current expenditures per pupil in A.D.A., nationwide	Personal income per capita, nationwide
Atherton	1951-62	0.41-2.90 mean value 1.7	Per pupil expenditures for each province	Personal income per capita in each province
		0.74-3.41 mean value 2.20	Per capita expenditures for each province	Personal income per capita
Atherton	1957-60 1961-65	3.0 0.9	Expenditures on operations per weighted pupil in Alberta	Personal income per capita in Alberta

IV. COMPARISON OF THE STUDIES

The review of the findings with regard to the income elasticity of either the property tax and its base or educational expenditures points out very clearly the various inconsistencies within the variables used which prevent a direct comparison of the studies mentioned. In particular, the use of different tax bases, forms of expressing personal income and educational expenditures, time periods considered, and methods of computation employed suggest that if this technique of analysing expenditures and revenues, is to be useful for comparative purposes then some form of standardizing the format of the data would be useful.

Despite these difficulties, it would appear that the trend of the general relationship between personal income and revenues of the property tax has changed in both the United States and Canada since World War II. This trend has been such that the value of the coefficient has increased over the years thus indicating a greater reliance on the property tax as a means of providing funds for educational expenditures. In the case of the ratio of educational expenditures and personal income no discernable trend was established over the same period.

Of the numerous criteria established as guides for taxation the one which has reveived much attention has been the "adequacy" criterion. Groves and Kahn considered adequacy to mean "not only the capacity of a particular tax

to produce a given initial amount of revenue but also its
capacity to sustain this level in such a manner as to permit
the maintenance of a given volume and quality of govern-
mental services" (1952, p. 87). Since that period there has
been an absence of severe economic cycles while at the same
time the federal government has become more committed to a
policy of economic stabilization at maximum employment.
Both of these factors are principally responsible for the
need to be less concerned with the stability of the property
tax. Consequently, adequacy has come to mean "the ability
of a given tax structure to meet the expanding needs of
public goods and services" (Wilford, 1965, p. 304).

CHAPTER III

THE RESEARCH DESIGN

I. INTRODUCTION

One of the purposes of this chapter is to explain, in some detail, the concept of economic growth, the variables which are considered in the study in addition to the sources which are used to derive the necessary data. A further section deals specifically with the techniques used in analyzing the data. In particular, this part of the chapter consists of an examination of the various methods of calculating the elasticity coefficient followed by an explanation of the application of this technique to the various problems which are considered in this study.

II. ECONOMIC GROWTH

The concept, "economic growth", though commonly used, has been defined in numerous ways. Some writers have included a quantitative measure of the concept while others have claimed that many of its elements defy measurement because some of the changes, such as occur in welfare, are qualitative. In very broad terms, the economic growth of a region may be described as the expansion of its output measured in terms of aggregate income (Firestone, 1968, p. 86; Siegel, 1965, p. 284).

Although the process of economic growth is extremely

complex, some economists maintain that certain forces are essential to the growth process in general. Gill (1964, p. 4) suggests that these forces have to do with size, organization and character of a region's basic productive apparatus which he defines as follows:

It requires, first of all, the existence of the basic productive agents, or factors of production, as they are commonly called. There must be labour, natural resources, and certain tools, implements, and other capital goods. It also requires that these factors of production be organized into some kind of producing units and that there be a minimum of technological knowledge to direct the society's productive efforts. Without any one of these elements a country's productive capacity would either vanish or sink to the level of the jungle (p. 4).

On the basis of the above statement it is permissible to consider economic growth as a process of expansion or improvement of the basic elements of production. Consequently, the level of a region's output of goods and services is affected by changes in both the factors of production and the production process itself. This latter definition of economic growth more readily permits the disaggregation of the basic mensuration of economic growth used for this study into measures that represent certain basic forces essential for economic growth.

Total aggregate income (I) of a region may be viewed as being derived from a product of the region's population (P) and its per capita income (i).

1. $I = P \times i$

This procedure readily separates out population which is

considered a factor affecting one of the basic production agents, labour. As a consequence, it becomes evident from the above equation that increases in population will lead to economic growth provided there is no decrease in per capita income and a growth of the working force occurs. The other factor, per capita income, may be regarded as the contribution to economic growth of changes in the production process. A change in the state of technology, when it is incorporated into production and distribution processes, will yield higher productivity per person with corresponding increases in per capita income. As the per capita income increases, a greater aggregate income will result provided no substantial decrease in population occurs. Thus, income per capita, may be regarded as a measure of the contribution to economic growth of the other production factors, natural resources and capital, through the process of technological development.

Since the study is basically concerned with the responsiveness of the demand for public education and its financial support to economic growth then consideration must be given to the factors listed above. The manner in which changes in the factors of economic growth relate to changes in educational revenues and expenditures and the variables required for this analysis are the subjects of the remaining sections of this chapter.

III. REQUIRED VARIABLES

The intent of this section of the chapter is to set out the form of the variables required and indicate the sources of data to be used in the analysis. If specific data are not readily available for certain years or provinces attempts are made to estimate it. In essence, the data required for this study are used in analyzing both educational revenues and educational expenditures.

Educational Expenditures

A number of spending measures may be employed in the estimation of elasticities of expenditures. One approach would be to restrict this measure to current expenditures by omitting capital outlays and debt services since they occur on an irregular basis. Though capital outlays for public education are omitted special attention is given to the debt service outlays. Such services include interest charges and debt repayments which, though dependent on capital expenditures, are much less erratic over time than capital investments. Since expenditures of this nature are of concern when estimating annual revenue needs, then debt service outlays are treated as a current expenditure. Therefore, for purposes of this study, current expenditures consist of general operating expenses, interest charges and debt repayments.

Such current expenditures may be treated in the aggregate form or as a ratio to some independent variable.

The use of the aggregate form is limited in that it does not account for fluctuations in either the total population or the pupil population in a province. Of the two common ratio measures, per capita and per pupil current expenditures, the former is more suitable in this study as it reflects an average measure of the burden of educational services per person in a province and also provides a common base for comparisons with per capita income.

A further factor which requires consideration is the change in prices due to inflationary factors rather than an appreciation in the value of money. While it is recognized that available price indexes suggest a differential movement over a period of time in both the general price level and the education price level, the results are primarily deter-mined by the choice of price index. The use of such an index can be just as misleading as relying on current dollar expenditures since there is no specific education price index for Canada. Therefore, from the standpoint of this study, in the absence of any generally accepted education price index, current dollars will be used as a measure of expenditures.

Property Tax Revenues

Another major dependent variable under consideration is the change in property tax revenue over time. Since such revenues are collected for a number of local services, this analysis is limited to those property tax revenues used for

education purposes.

Though the revenue is treated proportionately to another variable, in some analyses, use is also made of changes in the total annual revenue for educational purposes. While it is recognized that inflationary factors will contribute in some degree to increased revenues, the reasons previously given for expressing the expenditure variable in current dollars also apply in this case.

Provincial Education Grants

Provincial grants for education are intended to serve one or more of four major functions: (1) the stimulation of local spending, (2) the equalization of educational opportunities, (3) the promotion of efficiency in specific expenditure functions, and (4) the provision of local tax relief (Benson, 1964, pp. 205-206). On the basis of functions (1) and (4) above, it is justifiable to include provincial education grants as a determinant of changes in property tax revenues. Thus, it is possible to examine to some degree the actual role of provincial grants with respect to property tax revenues over a period of time. That is whether such grants promote local spending or give tax relief.

Sources of Provincial Revenues

It is extemely difficult to make a simple and truly realistic taxation classification. Neither the concept of "tax" and "non-tax" revenues, nor the division of "direct"

and "indirect" is completely useful for economic description analysis. Sirois suggests that:

> Both of these classifications have been developed, in great and precise detail, as useful tools for certain specific but limited purposes, and have, in their respective connections, acquired a pseudo-scientific weight (1940, p. 210).

From the above criticism one must conclude that no comprehensive categorization of revenue sources can be derived but only various classifications which attempt to bring out certain desired distinctive aspects of a revenue system. Though each of the provinces basically employ the same form of taxes, there are a number of variations in the tax structures that may be attributable to a province's political, economic and social make-up. In an attempt to examine the economic influences on provincial education grants, the major provincial revenue sources have been classified as follows: (1) federal grants, (2) non-tax sources of revenues such as royalties on natural resources, (3) provincial share of income tax revenues, and (4) revenues from taxes on commodities, normally paid by the consumer of these commodities. Table IV gives more detailed information regarding the classification of provincial revenues for this study. The purpose of making this sub-division is to determine the degree to which provincial grants for education are affected by changes in these revenue sources.

TABLE IV

A CLASSIFICATION OF MAJOR PROVINCIAL
REVENUE SOURCES FOR
ORDINARY REVENUES

Group	Types of Revenue Sources
Federal Grants	Grants-in-aid Shared cost contributions
Natural Resources	Royalties and rents on natural resources
Sales Taxes	Sales taxes on commodities Privileges, licences and permits Motor vehicles Profits from government enterprises such as liquor outlets
Direct Taxes	Corporation taxes Personal taxes Property taxes Succession duties Grants paid in accordance with the Tax Rental Agreement where applicable

Personal Income

In many elasticity studies, a measure of income has been the sole independent variable. The most commonly used measure of this indicator of economic growth is personal income per capita. Although, the use of per capita data accounts for fluctuations in population, it does have a number of inherent short comings (Studenski, 1943, pp. 32-55).

1. It is based solely on incomes received.

2. It is an average figure and presumes no significant differences in distribution of income among provinces.

3. It assumes that income levels are reasonably stable over a short period of time.

4. It assumes age compositions are the same in all provinces.

5. It assumes there are no significant differences in the relative values of the dollar from province to province and within given time periods.

Once the weaknesses of a measure have been expressed then it is necessary to explain the measures taken to accommodate for them. However, it is recognized that the task of making the measure perfect is futile especially when the data collected can never be exact.

To overcome the first criticism regarding the use of per capita income as a measure of personal income, the basic aggregate income is not restricted to wages and salaries

alone. Other sources of personal income as defined in the
D.B.S. publication, "National Accounts: Income and Expendi-
ture" are also included. As a further refinement the use of
disposable personal income which excludes personal direct
taxes accounts to some degree for the different income
distributions and age compositions which exist between
provinces. Thus, provinces with low incomes will have a
greater percent of aggregate income available for consumer
products and services than a province with much higher
income levels. Therefore, the use of disposable income per
capita as a contributing factor to economic growth is a
better estimate of income for the purpose of calculating the
various elasticities.

Since current dollars are also used in reflecting the
change in education expenditures as well as property tax
revenues within each province then there is little concern
for the relative value of the dollar either by province or
time. Thus, elasticities using these variables are
unadjusted by price indexes.

Population

In an earlier part of this chapter it was indicated
that economic growth may take place when a nation's or
province's output is increased. One contributing factor to
this growth was stated to be an increase in population
provided per capita income did not diminish significantly.
As a consequence, the responsiveness of the demand for

public education and its financial support to changes in the
variable, population, is considered. Though population
census data is collected only on a decennial basis, a number
of D.B.S. publications include extrapolations of the data
for the intervening years and use is made of these
approximations. Of the various D.B.S. publications,
extensive use is made of the population estimates by
province presented in the annual editions of the "National
Accounts: Income and Expenditures".

Tax Base

One of the economic factors which should have a
direct bearing on the growth of any tax revenue is the
increase in the value of its base. In most provinces this
base consists of the assessment of both real property and
personal property values. Since the value of the personal
property part of this base is a very small fraction of the
total base only the value associated with the real property
tax base is used. Two values of the property tax base are
used in this study. One measure is the assessed value of
real property in each province made by municipal assessors.
The other measure is an attempt by Lithwick (1967) to
estimate the market value of real property in Canada. This
market value of real property is derived from an aggregation
of the estimates of three components of this tax base:
business and industrial property, farm property and non-farm
residential property. The use of a national estimate of the

market value of real property is necessary because of the lack of such estimates at the provincial level.

A number of studies on the elasticity of the property tax base itself indicate that to reconcile differences in previous research and to evaluate the base, recognition should be given to five variables (Groves & Kahn, 1952; Blank, 1954; Netzer, 1961). First, the change in property value due to assessment practices must be distinguished from the change due to economic conditions by using full value estimates. This ensures that the elasticity constant measures real changes in the value of the real property and not administrative changes. Second, the secular movement of the tax base needs to be distinguished from cyclical or short-term movements. The selection of a time span which is long enough, will accommodate for this factor. Third, the real property tax base needs disaggregation by examining components of the base so that components of the base are not obscured. Fourth, the use of both current and constant dollar values should be considered so that the elasticity measurement is a real change and not merely a price change. Fifth, a consistent definition and measurement of the property tax base is needed so that a synthesis can be made of information from various sources. In the estimations of elasticity coefficients involving the real property tax base some degree of recognition is given where ever possible to the above factors.

Tax Rate

Although deliberate changes in the statutory tax rate
do increase or decrease the revenue of the tax, for a study
of this nature it is impossible to account for the many and
varied changes in the tax rate that occur annually in each
province because of the large number of school district
jurisdictions. Therefore, a province wide average rate is
considered.

Any tax rate may be determined by dividing the yield
of a tax for a particular year by the value of its tax base
in the same year. In the case of the property tax, the tax
rate is calculated by placing the property tax revenues
derived for a particular province's public education in the
numerator of the fraction described above and the estimated
market value of that province's real estate in the
denominator. Values for these variables, which have been
previously described, are in current dollars. This
particular tax rate is referred to as the effective tax
rate.

IV. COLLECTION OF DATA

Most of the statistical data for the previously
mentioned variables are either gathered directly, or
derived from, various federal and provincial publications.
The only data not readily available are current estimates of
the market value of real property. As a consequence, the
data for this variable for the years 1961 to 1966 are

estimated by the same method used by Lithwick (1967, p. 215)
for the earlier estimates of the market value of real
property. Reference to the specific sources used is
included in the tables of basic data given in the Appendix.

V. TREATMENT OF DATA

No matter which of the dependent variables is
analysed, an estimation of elasticity coefficients by one of
two common methods is required. Thus, this part of the
chapter consists of a description of the basic approach to
the estimation of elasticity coefficients. This is followed
by a brief explanation of the specific application of the
concept to the criterion variables under consideration: per
capita expenditures in education, provincial education
grants, property tax revenues, and assessed value of
property tax base.

The Elasticity Coefficient

The elasticity (e) of any dependent variable may be
defined as the ratio of the percentage change in the
dependent variable (x) to a given percentage change in the
independent variable (y). The relation may also be
expressed mathematically in the following manner:

$$2. \qquad e = \frac{\Delta x}{x} \Big/ \frac{\Delta y}{y}$$

This method is commonly used to measure changes between a
dependent and an independent variable within a short period
of time; (i.e. a year or less) and is called the cross-

section approach. Although it is considered a static method, it has the advantage of holding constant a number of relationships such as changes in the composition and distribution of income or changes in provincial or federal grant patterns (Burkhead, 1963, p.50).

To derive the elasticity coefficient using time-series data requires a different approach which, in effect, summarizes the data for a period of years and presents an average elasticity coefficient for an extended period of time. This approach involves the use of the simple least squares regression analysis of the form:

$$3. \qquad e = \frac{\log x + \log A}{\log y}$$

which assumes the coefficient to be constant over time. Under this assumption, the dependent variable is log linear in the independent variable and may be written:

$$4. \qquad x = Ay^e$$

For both equations, x represents the dependent variable, y the independent variable, e the income elasticity and A is a constant. In contrast to the cross-section approach, this method is considered to be dynamic with the consequence that the many economic and fiscal changes that influence income and revenue patterns are not held constant (Burkhead, 1963, p. 50).

The above explanation does not give any consideration to more than one predictor variable. Estimates of the responsiveness of the dependent variable to more than one

independent variable may be made with the application of multiple linear regression techniques to time-series data. Elasticity coefficients derived by this method depend not only on the size of the change in the variables concerned but also the value of the other independent variables.

Elasticity of Educational Expenditures

A large number of studies involving the responsiveness of educational expenditures to economic growth have limited the possible independent variables to one, which is often some measure of personal income. The elasticity measures of expenditures in this analysis include two independent variables. Two sets of elasticities are calculated which estimate the responsiveness of per capita education expenditures to changes in per capita disposable income and population. In this way, since education expenditures are assumed to be a reflection of the demand for education, in each province, the elasticity coefficients indicate the preference of the citizens for education as changes occur in two principal factors of economic growth. Such coefficients may be calculated by either of the methods outlined above depending on the type of data available.

If the trend in cyclical patterns of the elasticity coefficients is required then it is necessary to use the cross-section method. However, this approach is limited, in that it is not able to account for the interaction effect of the two independent variables, population and

per capita disposable income. The time-series method, which uses multiple regression analysis, overcomes the concern with the interaction effect but at the same time tends to obscure the cyclical patterns of the coefficient. Furthermore, since the latter method calculates an average elasticity coefficient for a given period of time it is considered more useful for purposes of prediction. On the basis of these reasons, multiple regression analysis using time-series data is employed to derive the elasticity coefficients of per capita education expenditure with respect to population and per capita disposable income.

Elasticity of Educational Revenues

In more recent years, the traditional approach of measuring the responsiveness of revenue sources to changes in personal income alone has been subjected to some re-evaluation with respect to independent variables which might affect tax yields (Wilford, 1965; Legler & Shapiro, 1968). The two most important weaknesses of earlier studies, as seen by Legler and Shapiro (1968, p. 46) are (1) the studies suggested that tax revenues vary with income, but ignored the specific mechanism by which they vary; (2) the studies were based on the assumption that the yields of one tax are unaffected by the yields of any other tax. Thus, the responsiveness of a given tax has been examined independently of other revenue sources and factors that might affect the mechanism by which tax yield varies with personal

income.

On the basis of the above criticisms, it would appear that studies of property tax revenues and provincial grants should attempt to specify and include in the analysis those independent variables that might affect the growth of the revenues. In analysing the responsiveness of the property tax revenues and provincial grants for public education to economic growth for each province and on a nationwide basis, consideration is given to the independent variables; personal income per capita (Groves & Kahn, 1952; McLoone, 1961) and population of province or nation.

A distinction between these two contributors to economic growth is essential since they may have differential effects on the increase of revenues from both sources. Any growth in personal income per capita will lead to a change in the interaction of the various taxes because of the progressive nature of the income tax and certain sales taxes. Despite the fact that the mechanism to explain the effect of this interaction on the educational revenues is complex, changes in disposable personal income per capita will serve as an adequate representative variable to indicate the consequences of this condition.

Population growth alone does not lead to such complications. If an increase in aggregate income is due to population growth, then it is most likely that the inter- action of the taxes will be relatively undisturbed, ceteris paribus, since the personal income per capita will remain

unchanged. The effect of this variable on educational revenues will be aggregative and dependent on the increase in population. Consequently, changes in the population of the province or nation will act as a determinant of revenue sources.

For a number of years, the provincial governments have been increasing their grants-in-aid for education to such a degree that in 1966 provincial grants funded 47.7 per cent of school expenditures. It has often been implied that the increase in this revenue source has in some cases reduced the local effort in financing public education. As a consequence, the additional independent variable, provincial grants is included to determine its effect on property tax revenues and thereby examine the validity of such statements.

Though the factors of economic growth mentioned above may strongly affect the potential revenues available from a specific tax or revenue source, the method of taxation may determine whether such a potential is reached. Obviously, if per capita income increases then a progressive tax will produce far greater revenues than a regressive tax. With respect to property tax revenues, consideration must be given to both the tax base and tax rate.

In assessing the value of land to establish a tax base, consideration must be given to the structures and fixtures erected on the land as well as the land itself. Therefore, though land is a fixed commodity its value may

be enhanced by a number of factors including price inflation,
location of property, and construction of buildings and any
growth in this base will lead to an increase in property tax
revenues. As a consequence, the tax base may be considered
as an economic factor which will affect the growth in
property tax revenues. In addition, one must also consider
the effects of changes in the tax rate on the level of
revenues. Since the property tax is relatively proportion-
al, a linear increase in revenues would be expected with
increasing tax rates. Thus, it may be concluded that both
the tax base and the tax rate, are the mechanics by which
the portion of personal income directed towards property
taxes is determined. The effect of changes of both of these
factors on property tax revenues is treated independently of
the main part of the analysis.

The situation with respect to provincial educational
grants is more complex since provincial governments tend to
maintain some degree of independence between revenues and
expenditures. The matter is further complicated by the
large number of revenue sources, used by provincial govern-
ments. Therefore, the effect of the method of taxation on
provincial grants is limited to an examination of the
responsiveness of such grants to changes in federal grants,
non-tax revenues, sales, and direct taxes.

After this review of the selection of factors which
are considered to affect both revenue sources of public
education it is now possible to express the relationships as

mathematical functions. Where two or more independent variables are involved it is assumed that some interaction exists between them which can be accounted for in the analysis.

In the case of property tax revenues, the mathematical relationship may be expressed as follows:

5. $R = f(y, N, P)$

Where y is disposable income per capita, N is the population, and P is the amount of provincial education grant. Total income is not included as an independent variable since it does not add any new information if a measure of per capita income and population are used separately. When expressed as a multiple regression equation, which accounts for the interaction of the independent variables, the relationship takes the following form:

6. $R = A \cdot y^{e1} \cdot N^{e2} \cdot P^{e3}$

where A is the constant of integration and e_x is the elasticity of the tax revenue with respect to each of the independent variables considered. Equation 6 is therefore a more general form of the revenue function of which the earlier formulations are a special case. For example, the Groves and Kahn equation may be derived from equation 6 if e_2 and e_3 are equal to zero.

In order to estimate the relevant elasticities it is more convenient to use the logarithmic form of the above regression equation:

7. $\log R = \log A + e_1 \log y + e_2 \log N + e_3 \log P$

The elasticity of a particular variable indicates the responsiveness of property tax revenues to a change in the variable if all other variables remain constant.

The equation which is used to determine the effect of changes in the factors of economic growth on provincial education grants is similar to the one developed above. The major change is that the variable, provincial grants, is no longer an independent variable but replaces property tax revenues as the dependent variable. Thus, the logarithmic form of the regression equation appears as follows:

8. $\log P = \log B + e_4 \log y + e_5 \log N$

In order to determine the significance of the elasticities, "F" ratio tests are conducted on the multiple regression coefficients of the equations. Since this particular form of analysis has not been previously employed it is permissible to use more liberal limits of significance. To indicate the relationship between the criterion variable and each predictor in each analysis, correlations are calculated.

Although the above analyses show the effect of factors of economic growth on revenue sources they do not indicate the movement of changes in the tax base and rate on property tax revenues nor of changes in provincial tax revenues on education grants. Since much of the criticism and proposed reforms of property taxation are concerned with the rates levied and the movement of the tax base, it is important to examine the trends in the elasticity of the

property tax base and the effective tax rate (i.e. ratio of property tax revenue to the full value of the property). Estimates of the responsiveness of the assessed value of the tax base to changes in population and per capita disposable income are derived by means of multiple regression analysis described earlier. This particular analysis cannot be attempted for some provinces because of the lack of necessary data.

An examination of the effective rate of the tax base is also attempted in order to answer a question first posed by Jensen in 1931 to which no empirical reply has been attempted in Canada:

> Is there a marked tendency towards increased property taxes when expressed as a percentage of the true value of the taxed property? (p. 310).

The term "true value" is subject to many interpretations but for the purpose of this study it is defined as the estimated market value of real property. In this phase of the study, the effective rates are calculated on the basis of nation-wide values of property tax revenues and estimated market values of real property for each of the years from 1930 to 1966. Effective rates at the provincial level could not be calculated because of the lack of provincial estimates of the market value of real property. The main purpose of developing these effective rates is to indicate how the rate has changed in the past and if any lee way exists for changes in the future.

The responsiveness of provincial education grants to

various revenue sources of the provincial governments is no
less important. Atherton (1968) has suggested that provin-
cial grants-in-aid to public education might be affected by
provincial non-tax sources of revenue and federal transfer
payments to the provinces. Since the provincial grants are
considered as a determinant of the responsiveness of
property tax revenues and are a major source of revenues, an
attempt is made to ascertain the effect of various provin-
cial revenue sources on the provincial funding of public
education. In addition to the sources of revenue mentioned
above, the effect of the general sales tax and income tax
are included. The method of analysis used employs a
multiple regression relationship similar to that employed in
deriving equation 5:

9. $\log P = \log D + e_6 \log F + e_7 \log T + e_8 \log S + e_9 \log I$
where D is the constant of integration, F represents the
federal grants-in-aid, T is the non-tax revenue of the
province, S is the sales tax revenue, I is the provincial
share of income tax revenues, and e_x is the elasticity of
the provincial grant to public education with respect to
each of the variables in each of the years for which data is
available.

In all of the multiple regression analyses suggested
above, elasticities are derived for selected periods between
1930 and 1966. From these series of elasticities, one
particular set is selected to determine whether or not the

present trends in financing public education in each
province are adequate for the decade 1971 and 1981.

CHAPTER IV

ELASTICITY OF PUBLIC SCHOOL EXPENDITURES

The findings and interpretations presented in this
chapter are restricted to that part of the study which
involves the investigation of the responsiveness of public
school current expenditures per capita to changes in both
population and disposable income per capita on a provincial
and nationwide level. The variables selected for this
investigation and the rationale for their selection were
advanced in the previous chapter (Chapter III).

I. CORRELATIONS OF EDUCATIONAL EXPENDITURES
WITH THE INDEPENDENT VARIABLES

Since measures of elasticity assume some relationship,
though not necessarily causal, between changes in the
dependent variable and changes in the independent variables
then an initial commentary on the simple correlation
coefficients between the variables used in the study is
merited. These comments are limited to describing the
degree of relationship between the variables by using the
collected data, rather than between the relative changes of
the variables from year to year. This approach is necessary
because the multivariate analysis technique employed to
derive elasticities uses the annual values of the variables
rather than their annual differences.

Testing the significance of a correlation between a

a set of paired observations is based upon an initial assumption or a null hypothesis that the value of the correlation coefficient is equal to zero. The hypothesis is then tested for significance by using a t-distribution. This test has been simplified to a large degree by the tabulation of the critical values of "r" for different degrees of freedom at different levels of significance (Ferguson, 1966, p. 413). Though it may not be readily observed from the table, if the correlation coefficient is to be considered significant, the value of the coefficient must increase as the number of degrees of freedom decrease. The number of degrees of freedom depend on the size of the samples which vary in this study from a minimum of seven pairs of observations to a maximum of thirty-seven observations. Correlations are only calculated for consecutive time periods. The critical values of the correlation coefficients at 0.10 level of significance for the samples sizes of these sub-periods are shown in Table V:

TABLE V

CRITICAL VALUES OF CORRELATION
COEFFICIENTS

df = N-2, Level of Significance = .10	
df	Critical value
5	.67
8	.55

[2]See Ferguson, 1959, p. 413.

The low level of significance was selected because of the

fact that little work has been completed on this topic in Canada.

In this study, the elasticity of educational expenditures is not limited to changes in income but also includes the effect of population changes. Therefore, the correlations considered are between educational expenditures per capita and either population or disposable income per capita. The simple correlations between educational expenditures per capita and population are given in Table VI. It is noteworthy that in the decade 1930-39, this correlation for each province is negative in sign while in subsequent periods positive correlations are in a preponderance. This relationship may be accounted for by the fact that in the depression era educational expenditures tended to decrease while the population continued to grow (see Tables XXXIX to XLIX). Though the same number of provinces in the 1930-39 and 1940-46 time periods have correlation coefficients which do not approach the 0.10 level of significance, only two provinces exhibit the same condition in two consecutive time periods, namely Nova Scotia and British Columbia. The simple correlation coefficients for each of the remaining time periods exhibit a certain stability of direction. Not only are the coefficients in each province positive, but tend to approach unity in moving to the 1957-66 decade.

The simple correlation coefficients between educational expenditures per capita and disposable income

per capita are given in Table VI. The table shows that the
correlation coefficients tend to become increasingly
significant and approach unity in all provinces with the
progression of time. In the 1930-39 period the non-
significant coefficients are evident in all the Maritime
provinces as well as Manitoba and Saskatchewan.

Significant correlation coefficients exist for all
provinces in all subsequent time periods with the exception
of British Columbia during the war-time period, 1940-46.
For the most recent time period, 1957-66, all of the
coefficients are greater than ·90 but for those of New
Brunswick and Saskatchewan. Such high correlation
coefficients are indicative of the close relationship of
educational expenditures per capita with economic growth.

The strong positive influence of both population and
disposable income per capita as indicators of educational
expenditures per capita is noteworthy. The implications are
that per capita education expenditures will increase with
changes in either factor of economic growth. The degree of
change of educational expenditures predicted by these two
variables is the subject of the following analysis.

II. CALCULATION OF ELASTICITIES OF EDUCATIONAL EXPENDITURES

The elasticity coefficients used in this chapter and
the subsequent one are derived from the application of
linear regression analysis to the logarthmic values of the

TABLE VI

CORRELATIONS OF EDUCATIONAL EXPENDITURES PER CAPITA WITH POPULATION AND
DISPOSABLE INCOME PER CAPITA, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	Population				Disposable income per capita			
	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966
Newfoundland				.96				.98
Prince Edward Island	-.56	-.23*	.75	.93	-.33*	.97	.92	.97
Nova Scotia	-.23*	.64*	.92	.92	-.14*	.77	.94	.97
New Brunswick	-.46*	.88	.86	.94	.39*	.88	.91	.97
Quebec	-.72	.96	.97	.97	.29*	.85	.96	.98
Ontario	-.26*	.91	.98	.99	.89	.76	.98	.97
Manitoba	-.71	-.10*	.97	.93	.48*	.91	.91	.92
Saskatchewan	-.61	-.90	.78	.89	.38*	.84	.60	.88
Alberta	-.73	.62*	.99	.98	.62	.87	.85	.92
British Columbia	-.27*	.38*	.92	.98	.79	.17*	.98	.94
Canada	-.60	.98	.99	.99	.68	.87	.97	.97

*Not significant at 0.10 level.
Source: Calculated from data in Tables XXXIX to XLIX

particular variables considered. When these logarithmic values are subjected to such analysis, the weights assigned to the independent variables may be used as the elasticities of these variables with respect to the dependent variable. The elasticity of a particular variable indicates the responsiveness of the dependent variable to changes in the independent variable, if all other variables remain constant. Thus an income elasticity of educational expenditures per capita of 2.46 indicates that educational expenditures per capita increase by 2.46 per cent for every one per cent increase in per capita disposable income.

The sign of each regression coefficient (or elasticity coefficient) is important. Should the sign of the coefficient be the reverse of the expected direction of influence it is evident that the variable in question is acting as a "suppressor" variable. Thus, though two variables may be positively correlated, the regression weight or elasticity coefficient of the independent variable may be negative which means that an increase of the independent variable is associated with a decrease of the dependent variable, if all other variables remain constant. For example, if the income elasticity of educational expenditures per capita were -2.46, then if all other variables remain constant, and the per capita disposable income increases by one per cent, the per capita educational expenditures will decrease by 2.46 per cent. Thus, the population and income elasticities of per capita educational

expenditures are useful in examining the demand for
education in connection with changes in a province's
disposable income per capita and its population.

Additional statistics reported in conjunction with
the elasticities include the following: the constant of the
derived regression equation and the square of the multiple
correlation (R^2) stated in a percentage form. This latter
statistic is an indication of the per cent of variance in
the dependent variable which may be associated with the
variation of the independent variables used in the
particular regression analysis. The high R^2's derived in
this part of the study indicate that the model is a good
predictor of educational expenditures per capita.

An immediate, and recurring, problem in this study is
that of the significance of the computed elasticities. This
is resolved by using a stepwise multiple regression
procedure by which to compute the multiple regression
coefficients used as elasticities. With this method, the
significance levels of the multiple coefficients of the
equations are indicated by the relevant "F" ratio tests.
For purposes of this study, in a field where little
knowledge exists, a level of significance of 0.10 was used
to determine the acceptability of an additional variable.
Before attempting any examination of these statistics, the
following quotation will be helpful in providing words of
warning with respect to a study employing data collected
over a long period of time:

The longer one looks back in time in an effort to
achieve perspective, the more uncertain the figures
become. Statistical data become increasingly unreliable
as the time horizon recedes, and all sorts of
complications emerge due, for example, to the changing
composition of market output. To search, moreover, for
a prolonged period over the past half century, which in
some sense can be regarded as normal is to follow a
will-o'-the-wisp. Two world wars and their aftermaths,
together with the great depression, make much of the
twentieth century abnormal (Brewis, 1968, p. 6).

Because of the unreliability of earlier data it is
felt that the calculation of elasticities should not be
limited to the overall period 1930-66, as elasticities are,
in a sense, average values which give only a brief synopsis
of the changes in the variables under study for the period
in question. This concern over suitable time periods is
further reinforced by the fact that each of the decades
under consideration is uniquely different with respect to
social, political, and economic conditions which one might
expect would affect the elasticities in each of the periods.
In the thirties, the depression had a pronounced effect on
the economy of all Western countries. The second World War
and its repercussions were the dominant feature of a major
portion of the forties, while the Korean War, to a lesser
extent, was a unique factor of the early fifties. If any of
the years under consideration in this study can lay claim to
any level of normality in terms of economic growth it might
be the period including the late fifties and early sixties.
Therefore, in an attempt to subdivide the period under study
into eras corresponding closely with those described above,
elasticities are calculated for the following time periods:

1930-39, 1940-46, 1947-56, and 1957-66. Elasticities are
also determined for the following combinations of sub-
groups: 1930-66, 1940-66, and 1947-66.

III. ELASTICITIES OF EDUCATIONAL
EXPENDITURES: FINDINGS

By way of introduction it should be emphasized at
this point that the analysis employed in this research
basically summarizes the changes in the variables to be
considered. Any year to year changes cannot be directly
considered but are reflected in the summarization. Further-
more, this type of analysis does not consider the level at
which each of the provinces support education nor the
percentage of personal income used for this purpose but
merely compares each province with its own past practice.
However, if either of the independent variables is
significant in changing the level of support for education
in one province it is reflected by a larger elasticity
coefficient than those for provinces which do not have a
similar response.

Income Elasticity of Public Education

The above term, income elasticity of public education,
is a measure of the responsiveness of expenditures per
capita for elementary and secondary education with respect
to changes in disposable income per capita. The income
elasticities for the various sub-periods are presented in
Tables VII and VIII. The absence of an elasticity

coefficient indicates that according to the "F" test of significance employed, the coefficient was not significantly different from zero. No significant income elasticity coefficients were derived in the case of four provinces for the period 1930-39 and one province in 1940-46.

For the sub-period 1930-39 only five provinces have significant income elasticity coefficients which range in value from 0.56 for Ontario to 0.18 for Quebec. Such elasticities which are substantially less than unity indicate that the increases in educational expenditures are not commensurate with those of disposable income per capita. A similar situation exists for the period 1940-46 with the major difference being that the range of elasticities is extended. The upper limit of the range moves closer to unity with Manitoba having an elasticity of 0.71 but the lower end extends into the realm of negative income elasticities. Both Quebec and Ontario exhibit such elasticities for this period having values of -0.69 and -0.23 respectively. Since the two largest provinces have negative income elasticities it is not surprising to observe that the nationwide income elasticity is also negative.

Both the post-war periods present income elasticities which are in some cases greater than one. In fact, two provinces New Brunswick and British Columbia in 1947-56 have the highest absolute elasticity coefficients for any period under study with values of 2.99 and 2.64 respectively.

The same time period also has the widest range of
elasticities as the minimum elasticity is 0.15 for Alberta.
The wide fluctuation in values of the income coefficient for
one province from one time period to another is most
evident in the case of British Columbia. In the first post-
war period the province registered the second highest
coefficient for the period whereas in the 1957-66 period
the same province exhibits the lowest income coefficient
with a value of -0.66. However, the other provinces either
maintain high income coefficients or increase them in the
post-war period.

When the sub-periods are combined to cover greater
periods of time many of the fluctuations of the elasticity
coefficient within a province disappear as do some of the
wide ranges of values in a given time period (see Table IX).
For example, in New Brunswick the 1947-66 value of the
elasticity coefficient is 0.47 whereas the income
elasticities for the sub-periods which were combined in the
1947-66 time period are 2.99 and 0.92.

To discern any particular trend for each of the
provinces is very difficult because of the fluctuations in
the income elasticities. If only the last three sub-periods
are examined then the provinces which have shown consistent
increases in income elasticities are Nova Scotia, Quebec
and Saskatchewan. However, no particular province retains a
consistently high or low elasticity from period to period.
In general, it would seem that the income elasticities in

the 1957-66 period are indicative of greater responsiveness of educational expenditures to changes in per capita income than in previous time periods. This development suggests that only since World War II has there been a discernible trend in which increased disposable income per capita has led to a percentage change equal to or greater than that produced by population growth in educational expenditures.

Population Elasticity of Public Education

The above phrase is used as a synonym for the responsiveness of elementary and secondary school expenditures to changes in the population of a province or the country, as the case maybe. The numerical values of the population elasticities for the various sub-periods which are presented in Tables VII and VIII indicate the percentage change in per capita educational expenditures for a one per cent change in population. Coefficients are omitted if they are not significantly different from zero according to the "F" test of significance described earlier.

In contrast to the income elasticities, the values of the population elasticities tend to be substantially higher and for some periods cover a greater range. An example of the greater divergence that exists in the values of population elasticities is evident in the 1930-39 sub-period. For this decade, the lowest value of the inter-provincial range is recorded by Saskatchewan (-15.09) and moves to a

high of 0.57 in Quebec. Though the range is relatively
great it may be observed that all but one of the population
elasticities for this era have negative values in contrast
to the other periods under inspection. By way of
comparison, of the elasticity coefficients recorded for the
subsequent period, 1940-46, only one coefficient is
negative. Furthermore, the range of population elasticity
values between provinces for this period is narrowed down
from a low of 1.38 attributed to Prince Edward Island to a
high of 11.52 recorded for Manitoba, provided Saskatchewan's
population elasticity of -5.74 is regarded as exceptional.

For the periods following World War II it would
appear that the responsiveness of educational expenditures
to changes in population show a marked reduction for most
provinces in contrast to the 1940-46 period. In fact, for
1947-56 three provinces, Prince Edward Island, New Brunswick
and British Columbia as well as the nationwide value of the
coefficient are all negative. Furthermore, in 1957-66 the
range of provincial population elasticities ranged from a
maximum of 4.23 in British Columbia to a minimum value of
1.44 observed for Newfoundland.

The population elasticities exhibited in Table IX for
the total time period 1930-66, tend to be higher than for
the other combined time periods. In general, the
elasticities become smaller as the combinations of sub-
period omit the less recent eras under study. Thus, the
range of elasticities for 1947-66, 0.54 (British Columbia)

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TABLE VII

ELASTICITY COEFFICIENTS OF EDUCATIONAL EXPENDITURES
PER CAPITA, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 – 1939				1940 – 1946			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Prince Edward Island	2.08	– 1.15	–	31.85	– 2.04	1.38	0.54	97.31
Nova Scotia	–	–	–	–	– 0.68	–	0.46	58.66
New Brunswick	–	–	–	–	0.43	3.77	0.24	81.69
Quebec	2.60	0.57	0.18	57.95	6.19	6.83	–0.69	98.64
Ontario	– 0.68	– 0.84	0.56	88.02	3.75	2.53	–0.23	91.50
Manitoba	3.58	– 7.10	0.37	65.65	– 7.75	11.52	0.71	87.88
Saskatchewan	13.27	–15.09	–	37.23	6.23	– 5.74	0.03	81.18
Alberta	2.07	– 2.72	0.34	92.66	– 1.08	2.98	0.32	88.89
British Columbia	– 0.19	– 0.58	0.49	73.57	–	–	–	–
Canada	85.88	– 1.97	0.47	85.88	–84.86	5.48	– 0.29	99.50

Source: Calculated from data in Tables XXXIX to XLIX

TABLE VIII

ELASTICITY COEFFICIENTS OF EDUCATIONAL EXPENDITURES PER CAPITA, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1947 - 1956				1957 - 1966			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Newfoundland	-	-	-	-	-22.09	1.44	1.02	96.52
Prince Edward Island	4.88	-1.18	1.77	86.34	-41.49	3.03	1.46	95.83
Nova Scotia	-25.33	2.35	0.71	89.36	-38.89	2.44	1.40	96.05
New Brunswick	- 4.52	-0.90	2.99	83.36	-33.66	2.34	0.92	96.29
Quebec	-41.15	2.63	0.60	95.49	-41.53	2.08	1.89	98.08
Ontario	-28.91	1.66	0.95	98.79	-48.20	3.03	0.69	97.62
Manitoba	-46.09	3.35	0.54	94.46	-48.77	3.35	0.94	91.51
Saskatchewan	-78.46	5.76	0.49	72.93	-44.51	3.27	0.55	86.26
Alberta	-29.96	2.35	0.15	98.48	-23.71	1.80	0.38	96.77
British Columbia	- 7.50	-0.56	2.64	96.59	-51.32	4.23	-0.66	96.78
Canada	34.31	-2.15	0.49	90.60	-62.03	3.72	0.57	99.93

Source: Calculated from data in Tables XXXIX to XLIX

to 4.71 (Manitoba) if Saskatchewan (9.27) is again considered exceptional, is somewhat less than the range of provincial values for the entire period. In this period, 1930-66, the lowest elasticity is recorded by British Columbia (0.67) and the highest value of 7.96 is attributed to Nova Scotia.

Once more it is impossible to detect any trends in population elasticities for all provinces. No one province maintains a consistently high or low elasticity coefficient but fluctuations occur from province to province depending on the time period being investigated. Though the general trend in moving to more recent time periods is towards lower population elasticities only Quebec and Alberta exhibit a consistent reduction in the value of their respective sets of income elasticities.

In summary, it would appear that a very broad trend is discernable for both income and population elasticity coefficients in the time dimension which cannot always be applied to a specific province. The majority of provincial income and population elasticities tend to be positive in sign for all the sub-periods with the exception of the 1930-39 decade. During this period, expenditures for education in some years decreased in comparison to the previous year while the population continued to increase. As a consequence, the majority of population elasticities recorded for this period exhibit negative values. A further generalization may be made with regard to the absolute

TABLE IX

ELASTICITY COEFFICIENTS OF EDUCATIONAL EXPENDITURES
PER CAPITA, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 - 1966				1940 - 1966				1947 - 1966			
	Constant	Popula-tion	Per capita disposable income	R^2	Constant	Popula-tion	Per capita disposable income	R^2	Constant	Popula-tion	Per capita disposable income	R^2
Newfoundland	-	-	-	-	-	-	-	-	-34.00	2.46	0.82	98.05
Prince Edward Island	- 4.68	7.77	0.56	93.22	- 6.95	5.95	1.05	97.52	- 9.85	1.14	1.86	97.01
Nova Scotia	2.56	7.96	-0.38	89.96	- 1.44	7.38	0.24	97.15	- 4.77	4.60	0.91	98.46
New Brunswick	-38.17	2.79	0.70	90.48	-36.43	2.40	1.21	94.28	- 2.63	3.97	0.47	93.48
Quebec	- 7.30	0.88	1.52	94.27	4.46	5.44	-0.41	98.95	- 1.51	3.88	0.53	98.54
Ontario	3.56	3.72	-0.21	97.94	2.53	3.63	-0.07	99.49	- 1.39	2.75	0.53	99.53
Manitoba	- 2.01	5.06	0.33	97.07	- 3.83	4.21	0.67	99.37	- 2.67	4.71	0.46	98.96
Saskatchewan	- 7.76	6.32	1.02	94.02	- 8.02	6.02	1.09	93.48	- 4.32	9.27	0.26	96.52
Alberta	-32.36	2.43	0.35	96.49	-31.59	2.27	0.56	97.90	-34.02	2.60	0.25	97.79
British Columbia	- 4.57	-0.67	1.20	89.97	- 9.36	-0.22	1.84	94.63	-17.99	0.54	1.94	97.86
Canada	-62.76	4.07	-0.15	97.51	-62.88	4.02	0.0	92.99	-52.20	3.14	0.53	99.48

Source: Calculated from data in Tables XXXIX to XLIX

values of both forms of elasticities. In moving to more recent times both population and income elasticity coefficients exhibit less divergence in the values from province to province. Furthermore, the differences between a population elasticity coefficient and the income elasticity counterpart for a particular province and time period has narrowed in more recent years. Though both elasticities appear to be approaching a common value, the population elasticity coefficient throughout the study has maintained a substantially larger value than the income coefficient. How long this particular trend may continue is subject to question.

IV. INTERPRETATION OF FINDINGS

Previous studies which have employed the elasticity concept to measure the demand for education have tended to use only income coefficients of expenditures as an indicator of demand. This approach is based on Wagner's concept that demand for a public good is essentially determined by the level of per capita income.

Wagner (see Bird p. 70) observed, as early as 1863, that as the per capita income increases in industrial nations the public sector grows in relative importance with respect to the private sector. On the basis of these observations, Wagner predicted a considerable relative expansion of cultural and welfare expenditures, especially with respect to income redistribution and education. The

basis for this prognostication lies on his assumption that public services constitute a type of "superior" or "luxury" goods, of which more would be demanded as income per capita rises.[1]

The measure of income elasticity of a particular public service expenditure is directed towards measuring changes in the support of such a service. Thus, the elasticity measure of educational expenditures is an attempt to measure the public preference for education as changes occur in per capita income.

> As students of social process, we should anticipate that, in general, the income elasticity of demand for education would be in excess of unity; in other words, that schools, both as a consumption good and as a form of investment in productive capacity, would take a larger proportional, as well as a larger absolute share of the goods and services produced by an economy whose level of living is rising (Thomson, 1952, p. 397).

The above statement is based on Wagner's premise that as per capita income increases then the spending habits of the consumer change. If a consumer's income is below or at the subsistence level then all his expenditures will be on basic necessities to ensure survival. Once an individual's income rises above this level, providing prices remain constant or increase at a lower rate than income, then the spending habits of the person can be expected to change.

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[1]A good may be designated as a "necessity" when the slope of its demand curve is independent of changes in per capita income and as a "luxury" when the slope of the curve indicates a responsiveness to changes in per capita income.

Though the actual amount of income spent on essentials will be unchanged, less then one hundred per cent of the income will be used for these items which will enable the consumer to buy "luxury" goods. The preference for each of an unlimited choice of luxury goods may be indicated by the income elasticity of demand measure.

In the past, the use of income elasticities of public education as a reflection of the demand for education has been fairly common. However, the implicit assumption in this approach is that increases in per capita educational expenditures are solely dependent upon one factor of economic growth; an increase in per capita disposable income. According to the elasticities calculated in this study such is not the case. Population growth in many provinces appears to play a more than equal part in the prediction of increased demand for education. This fact is only made apparent by the employment of the multiple regression technique which permits the calculation of partial elasticities. An additional observation through the use of this method is the lower income elasticities of education computed in this study when compared to similar sets of coefficients reported in other research. This observation suggests that the previous income elasticities of education compensate to some degree for the lack of concern in earlier studies for the effect of population growth on the increasing demand for education. Low income elasticities are particularly noticeable during 1930-39

when both per capita educational expenditures and per capita
disposable income experienced declines in some years. This
relative stability of demand for education with respect to
changes in per capita disposable income continued throughout
World War II for most provinces. It was not until the
beginning of the post-war period did per capita educational
expenditures increase proportionally with improved per
capita disposable incomes. The only major exception to this
trend is found in British Columbia, where in the most recent
post-war period increases in per capita income led to a
decline in per capita educational expenditures. This may be
accounted for by the fact that the ratio of student to
total population is not increasing at the same rate as in
other provinces because of the influx of retired people into
the province.

The apparent development of an increased demand for
education may be a factor of the growing realization of the
importance of education. The three basic factors of
production are often quoted as land, labour and capital.
Prior to World War II the majority of people believed that
an individual's income might be improved by either acquiring
more land and capital or developing the physical qualities
of his capacity to work. Only in recent years has the
concept that the improvement of the intellectual quality of
labour through education been accepted as an important
contributor to economic growth. This trend is reflected
through increased income elasticities of education.

Increased investment in education as the per capita income rises is most noticeable in the so-called "have-not" provinces east of Ontario which tend to lack capital or well developed resources. In contrast, Ontario which has had one of the highest per capita incomes of the country has not felt the same need to invest in education as per capita incomes improved.

According to the findings presented earlier it would seem that the demand for education is more sensitive to changes in population than in per capita disposable income. Because of the poor economic conditions in 1930-39, the demand for education in this era accounted for by population growth was negative. During this period, educational expenditures per capita actually declined while aggregate income showed little if any growth. In subsequent time periods, very high population elasticities point out the importance attributed to population changes rather than changes in per capita disposable income as the dominant factor accounting for a changing demand in education.

An explanation for the growing demand for education as population and per capita income are increasing is not limited to one of a completely economic nature. Two major concerns of federal and provincial governments in this country are the improvement of both aggregate and per capita incomes. While technological improvements increase per capita income and aggregate income, the level of employment is a determinant for aggregate income alone. Therefore,

with growing populations it is essential, according to the above goal, to ensure high levels of employment. By doing this economic growth is assured.

However, at the same time certain segments of society have promoted the need for a greater amount of individual education. As a consequence, students are encouraged to remain in school with the result that greater numbers of students are completing matriculation requirements. This improvement in the level of education of the population has led to the raising of academic requirements for many jobs though the intellectual demands for the position have not changed. Thus, the level of an individual's education has to some degree become a determinant of the level of employment and thereby the rate of economic growth.

To meet this need for continued and increasing investment in education it becomes necessary that still more of the population complete their formal education at the secondary level. These increases in enrolment alone are not responsible for the rise in per capita educational expenditures. Rising price levels for educational goods and services together with increases in the quality or quantity of educational programmes offered are also contributing factors to the higher costs of education. Therefore, despite the fact that the demands of industry for secondary education might be met, as long as inflation exists and public education accepts to an increasing degree the

function of socializing the young then the demand for public education will continue to grow.

It would appear that a satisfactory proportion of the people already entering the labour market are successfully completing the final academic requirements for public education since the importance of this level of public education as a factor of employment and a contributor to economic growth is beginning to diminish. This trend is evident from the population elasticities of educational expenditures computed in this study. Although these elasticities are consistently high, the demand for education accounted for by changes in this factor of economic growth tends to have diminished in more recent years. In contrast, the increase in the value of income elasticities in more recent years suggests a growing effect of inflation and personal consumption needs on the demand for education.

In conclusion, each province's demand for education is dependent to some degree on factors of economic growth. Such factors are not necessarily fully known or readily given numerical values and the particular variables used in this study represent an attempt to separate the complex forces of economic growth due to changes in population and technical innovations, acting on public educational expenditures. On the basis of this assumption, it may be generalized that the demand for public education is far more sensitive to changes in population rather than per capita disposable income. However, the comparatively high

susceptibility of public school expenditures to population growth is declining to some degree. Neither population nor per capita income demonstrate consistent or uniform demands for all provinces on either a long or short time basis. This condition is to be expected since economic, social and political factors do not only vary with time but also with geographical regions.

V. EDUCATIONAL EXPENDITURES EXPRESSED AS A PERCENTAGE OF DISPOSABLE INCOME

Any change in either the income or population elasticities of educational expenditures reflects an adjustment in the percentage of income used for educational purposes. For example, an increase in the income elasticity of educational expenditures indicates that the rise in per capita income was smaller than the per capita educational expenditure increment with the result that the educational expenditures expressed as per cent of disposable income would show an increase. In contrast, a decrease in the elasticity would reflect a lower per cent value of educational expenditures compared with disposable income. In neither case do changes in elasticities permit an estimate of the general magnitude of educational expenditures expressed as a per cent of disposable income. However, knowledge of this particular percentage ratio is useful in comparing the provinces in terms of the proportion of income used for public education.

The data in Table X present educational expenditures
as a per cent proportion of disposable income for each
province and on a nationwide basis for selected years within
the time span under study. A selection of years was
considered to be satisfactory in light of the fact that no
abnormal developments were observed when the computation was
made for each of the years in the time period.

In the initial year for study, it is observed that
the educational expenditures expressed as a percentage of
disposable income for all provinces, save two Prairie
provinces, ranged between 2.09 and 3.41. Of the two
exceptions, the computed value of the ratio for Saskatchewan
is 6.52 per cent while 4.48 per cent is the value attributed
to Alberta. During the initial part of the depression era,
all of the provinces exhibited a greater commitment of funds
to education than in previous years, except in the case of
Saskatchewan, which did not maintain its relatively high
level. Thus, by 1936, the educational expenditures
expressed as a percentage of disposable income by any
province was not less than 2.56 per cent.

Towards the latter end of the thirties and during the
World War this ratio diminished to the point where in 1945,
Saskatchewan led with the highest value of the proportion
of only 2.69 per cent. The majority of the provinces at
this time indicated a value of less than 2 per cent. In
more recent years the trend appears to have slowly reversed
with the result that in 1966, the ratio of educational

TABLE X

EDUCATION EXPENDITURES EXPRESSED AS A PERCENTAGE OF DISPOSABLE
INCOME, BY PROVINCE FOR SELECTED YEARS

Year	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
1930	—	2.09	2.61	2.76	2.42	3.13	3.40	6.52	4.47	2.61	3.16
1933	—	3.72	4.10	4.11	3.46	3.65	4.19	6.52	6.12	3.29	3.88
1936	—	2.73	3.14	2.94	2.56	3.38	3.18	4.31	4.79	2.76	3.20
1939	—	2.26	2.93	2.96	2.55	3.14	2.98	3.06	3.94	2.68	2.97
1942	—	1.76	1.74	1.98	1.83	2.08	1.97	2.04	2.29	1.69	1.98
1945	—	1.42	1.74	1.79	1.97	1.89	2.23	2.69	2.68	1.66	2.00
1949	2.74	2.06	2.76	3.07	2.01	2.19	2.40	3.00	3.07	2.44	2.35
1952	2.65	1.94	2.72	3.88	2.13	2.56	2.37	2.54	2.91	2.88	2.54
1955	3.44	2.71	2.91	3.59	2.78	3.06	3.07	4.17	3.96	3.26	3.14
1958	4.05	2.99	3.77	4.44	3.44	3.57	3.09	5.29	5.30	3.75	3.77
1961	4.46	4.07	4.68	5.05	4.60	4.64	4.75	7.29	6.26	4.70	4.88
1964	4.86	4.82	5.25	5.25	6.14	5.38	4.73	6.09	6.39	5.02	5.60
1966	4.74	5.14	5.36	5.09	6.85	5.83	4.94	5.70	6.15	5.15	5.84

Source: Calculated from data in Tables XXXIX to XLIX

expenditures to disposable income was generally higher than
it had ever been in any previous year. The only exception
was the value for Saskatchewan. In 1966, the range of
values extended from 4.74 per cent to 6.85 per cent. Thus
over a span of thirty seven years the ratio had in most
provinces doubled in its numerical value.

The fact that the ratio increased in numerical value
in the early thirties is not surprising. Though both
disposable income and educational expenditures were reduced
in this period, educational expenditures were controlled to
some degree by the legal educational requirements of the
provinces. Thus, expenses could not be curtailed to the
same degree that incomes decreased with the result that, on
the average, a greater part of an income had to be committed
to education. As the economic conditions slowly reversed
themselves less of the income was required for public
expenditures. In addition, the eruption of World War II
increased the degree of economic upswing as well as
diverting many of the public funds to the war effort. The
resulting consequences to education are reflected in the
data presented in Table X. In the post-war period, the
concern for education has been expressed in a number of ways
which include extension of the compulsory school leaving
age, lower teacher-student ratios, and vocational education.
Factors such as these have contributed to higher per pupil
costs with the consequence that a greater percentage income
is used to meet the expenditures for public education in all

of the provinces.

Perhaps the most significant finding from the data in Table X is the little variation in values from province to province despite the fact that economic, social, and political factors vary considerably from region to region across Canada. One way to indicate such regional disparities is by expressing per capita disposable income, which is considered to be a fundamental measure of the well-being of a province's population, as a per cent of the Canadian average. This information on a province-by-province basis for the selected years used in the previous table is given in Table XI. This table reveals the considerably uneven distribution of disposable income from province to province.

Disposable income per capita in Newfoundland and Prince Edward Island has been typically around half that in British Columbia or Ontario, and in some years it has been substantially lower than this relationship. Disposable incomes in the Prairies vary around the mean for the country as a whole, but it may be noted that incomes in Saskatchewan were as low as 48 per cent of the national average in 1933 and reached a high of 115 in 1952. The value in 1966 was 107. No other province shows the same degree of instability. The explanation, of course, lies in Saskatchewan's heavy dependence on wheat production and exports.

Though the disparity in disposable incomes from

TABLE XI

PER CAPITA DISPOSABLE INCOME EXPRESSED AS A PER CENT OF CANADIAN AVERAGE, BY PROVINCE AND SELECTED YEARS

Year	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1930	-	57	73	65	91	123	98	62	90	129
1933	-	52	77	53	94	128	93	48	74	134
1936	-	58	79	66	92	125	93	59	76	134
1939	-	54	76	64	87	124	90	78	89	127
1942	-	49	77	62	81	120	94	108	108	117
1945	-	64	84	74	82	122	97	90	96	117
1949	52	60	75	70	84	118	103	103	107	120
1952	50	61	72	66	83	116	99	123	115	117
1955	55	57	75	68	86	118	95	92	103	121
1958	56	61	76	65	86	118	101	87	107	117
1961	63	65	80	71	88	117	97	79	104	117
1964	62	70	78	72	89	114	99	94	100	114
1966	65	68	77	74	89	111	98	107	107	114

Source: Calculated from data in Tables XXXIX to XLIX

province to province is significant, the per cent of income
devoted to education is approximately the same. From this
observation it would appear that education can do little to
narrow the gap between the richest and poorest provinces.
If education is to help in the area of economic growth,
policies for the poorer provinces must call for a greater
sacrifice of present income to increase investment in
education in order to ensure a greater per capita or
aggregate income in the future. Though the elasticities of
educational expenditures for these provinces indicate that
steps are being taken in this direction, the data in the
last two tables **suggest** that for educational policies to be
successful in the area of increased incomes, much more
drastic measures would have to be taken. Such an approach
would more than likely defeat the original purpose because
other public sectors would suffer as a direct result of
increased expenditures in education. Furthermore, the
assumption that aggregate or per capita income can be
improved indefinitely by education alone is, in the least,
highly dubious. For economic growth to occur a particular
combination of material resources, capital and labour are
required at the right time and in the proper location.
Education merely ensures, from an economic viewpoint, that
the labour factor in a particular location is flexible
enough in its attitudes and intellect to adjust to new
requirements or to facilitate its geographic mobility. Thus

it would appear that the marginal effectiveness of educational expenditures is more limited than is often admitted.

CHAPTER V

ELASTICITIES OF PUBLIC EDUCATION REVENUE
SOURCES: FINDINGS

The findings of the empirical analysis of the demand

for public education which involved the investigation of the

elasticities of per capita educational expenditures, have

been given in the previous chapter. The findings of the

second part of the empirical analysis, involving the

elasticities of the two main sources of revenue, provincial

education grants and property tax revenues, for each

province and Canada are presented in this chapter. The

presentation of these findings is organized on the basis of

the two main forms of financial support for public

education. Part one focuses attention on the findings which

involve the elasticities of property tax revenues and the

property tax base. The second phase is concerned with

elasticities of the provincial education grant. The

selected variables, and the statistical technique employed

in their analysis are outlined in Chapter III. Since a

number of separate regression analyses are employed in this

chapter, Table XII provides a summary of the independent and

dependent variables used in each analysis.

I. THE PROPERTY TAX

The property tax has been a general mainstay of

educational finance despite the many criticisms it has

TABLE XII

SUMMARY OF VARIABLES USED IN STEPWISE
REGRESSION ANALYSIS FOR
THE CALCULATION OF
ELASTICITIES

Dependent variables	Independent variables associated with a particular independent variable
property tax revenues[1]	population disposable income per captia provincial education grants
assessed value of real property	population disposable income per capita
estimated market value of real property	population disposable income per capita
provincial education grant	federal grants royalties from natural resources revenues from taxes on commodities direct tax agreements
provincial education grant per capita	population disposable income per capita

[1]All variables are provincial measures except where
otherwise stated.

received. This part of the study is concerned with the past
performance of the tax in two ways. The initial concern is
with the responsiveness of property tax revenues to changes
in population, per capita disposable income and provincial
grants. Property tax revenues are to some degree dependent
on the value of the property tax base. Therefore, a second
area of interest is the responsiveness of the tax base to
changes in a similar set of independent variables.

II. ELASTICITY OF PROPERTY TAX REVENUES

The elasticities are derived by means of a step-wise
multiple regression using the logarithmic values of the
variables. The same analytic technique is used to compute
elasticities in subsequent parts of this chapter. While the
main part of the findings is related to an analysis of the
elasticities, a brief comment concerning the simple
correlation coefficients between the independent variables
and the dependent variable is necessary.

Correlation coefficients of property tax revenues.
Statements regarding the significance of correlation
coefficients made in Chapter IV are equally applicable in
this chapter and will not be restated in order to avoid
undue repetition. In this and subsequent parts of the
chapter which consider the significance of correlations, a
confidence level of 0.10 is applied to all correlation
coefficients.

The simple correlations between property tax revenues and each of the independent variables; disposable income per capita, population, and provincial education grants for each province and by selected time periods are given in Table XIII. All three sets of correlations exhibit almost identical trends. In the 1930-39 decade, none of the correlation coefficients with population are significant and the majority of the other coefficients are not significantly different from zero. Of the remaining coefficients for this period, only the correlation with provincial education grants for Prince Edward Island is negative. In the subsequent time periods non-significant coefficients are very limited.

An additional pattern of changes in correlation coefficients with respect to the time factor is apparent for the three sets of correlations. The coefficients in the more recent time periods are closest to unity with the greatest fluctuations occurring in the 1940-46 time period where the correlations vary from -0.87 to 0.96. In the 1947-56 and 1957-66 time periods the majority of provinces exhibit correlation coefficients at or above 0.90 with none below 0.60.

Elasticity Coefficients

The elasticity coefficients given in Tables XIV and XV are derived from the application of multi-variate analysis to the logarithmic values of the variables under

TABLE XIII

CORRELATIONS OF PROPERTY TAX REVENUES WITH POPULATION, DISPOSABLE INCOME PER CAPITA, PROVINCIAL GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	Population				Provincial grants				Disposable income per capita			
	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966
Prince Edward Island	.01*	.01*	.86	.90	-.70	.99	.97	.95	-.05*	.91	.96	.97
Nova Scotia	.51*	.90	.96	.92	.40*	.97	.85	.99	-.02*	.96	.98	.96
New Brunswick	.38*	.83	.93	.89	-.43*	.95	.94	.76	-.18*	.87	.97	.98
Quebec	.40*	.91	.97	.92	.20*	.73	.92	.92	-.59	.86	.99	.98
Ontario	-.01*	-.32*	.97	.97	.87	-.85	.99	.98	.78	-.20*	.99	.95
Manitoba	-.11*	.11*	.97	.95	.67	.83	.95	.93	.54*	.89	.91	.94
Saskatchewan	-.33*	-.84	.79	.87	.73	.65*	.98	.96	.45*	.84	.67	.93
Alberta	-.39*	-.48*	.95	.98	.40*	.96	.89	.97	.58	.85	.88	.93
British Columbia	.51*	.96	.88	.98	.45*	.94	.79	.99	.66	.86	.95	.95
Canada	-.36*	.94	.99	.99	.82	.78	.99	.99	.70	.94	.98	.97

*Not significant at 0.10 level.

Source: Calculated from data in Tables XXXIX to XLIX

consideration. The details regarding significance of elasticity coefficients in this part and subsequent sections of the chapter are dealt with adequately in Chapter IV and therefore will not be repeated. Elasticity coefficients for Newfoundland are not included since revenues from property taxes are not used extensively in the support of public education in this province.

Population elasticities of property tax revenues. In all instances except one, the computed elasticities which represent the responsiveness of property tax revenues to changes in population do not exceed 2.40 for any of the four distinct and separate time intervals. The exception is the coefficient for Alberta during the time span 1947-56, which is 4.42. A further generalization to be observed is that all the coefficients tend to be positive with the notable exceptions of Saskatchewan (-1.92) in 1940-46 and British Columbia (-0.06) in 1957-66.

Although the number of provinces with population elasticities of property tax revenues greater than unity remains relatively constant at five in the last three sub-time intervals, the same provinces do not always maintain this relatively high coefficient in all the time-periods considered. In fact, the only province which maintains a population elasticity over one of the three most recent time spans is Alberta. Despite the relatively high value of many of the coefficients, a discernable

decrease in the overall value of population elasticities is
evident in the post-war period for all provinces except
Quebec and Ontario. Not only do the values of the
coefficients for these two provinces increase in size but
there is also a change to a positive value.

The population elasticities for the extended time
periods are presented in Tables XVI and XVII. Once more the
number of provinces exhibiting an elasticity greater than
one is in the majority for each of the extended time periods
considered. The only negative coefficient being that
computed for New Brunswick (-1.94) in the time period
1930-66. In addition, the diminishing responsiveness of
property tax revenues to changes in population may be
observed in the coefficients of period 1947-66 when compared
with those of 1940-66. The coefficients during the latter
time span range up to 4.75 but in the 1947-66 period the
majority of provinces have coefficients less than 2.0.

Income elasticities of property tax revenues. On the
average, the elasticity coefficients which indicate the
degree of responsiveness of property tax revenues to changes
in disposable income per capita are substantially lower than
the coefficients previously examined. With the exception of
British Columbia (3.90) in 1947-56 and Quebec (2.72) in
1957-66, no income elasticity coefficient for the sub-time
periods examined is greater than 1.97. Despite this
relatively high value, the majority of provinces have income

elasticities with values less than unity but only one province, Ontario, indicates a negative response to changes in disposable income which is significant after the decade 1930-39. This particular income elasticity is -0.53 and is recorded during the 1957-66 time span.

A consistent positive increase in the value of the income elasticity coefficient throughout the first three time periods is observed in the elasticities of Prince Edward Island, Quebec, Manitoba and Alberta. However, there is no such consistency in the value of the elasticities of each of these provinces in the last time period. The remaining provinces indicate a cyclical fluctuation in coefficient values with respect to time.

For the major number of provinces, in the time intervals 1930-66 and 1940-66, the income elasticity coefficients are less than one. Once the effect of the earlier periods is removed then the value of the income elasticity tends to become greater. In 1947-66, eight of the provinces have income elasticities ranging from 0.76 to 2.40.

Grant elasticities of property tax revenues. The coefficients which represent the responsiveness of property tax revenues to changes in the provincial educational grant exhibit the lowest set of inter-provincial elasticity values when compared with the property tax revenue elasticities computed for this study. On only four

TABLE XIV

ELASTICITY COEFFICIENTS OF PROPERTY TAX REVENUES,
BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 – 1939					1940 – 1946				
	Constant	Population	Per capita disposable income	Provincial education grant	R^2	Constant	Population	Per capita disposable income	Provincial education grant	R^2
Prince Edward Island	23.98	0.93	-	-1.79	51.11	-15.50	0.60	0.13	1.57	98.30
Nova Scotia	-	-	-	-	-	5.05	0.59	0.08	0.10	97.34
New Brunswick	-	-	-	-	-	- 9.61	1.59	-0.02	0.28	94.19
Quebec	16.84	-	-0.17	0.06	51.60	- 9.15	1.71	0.37	-0.13	86.21
Ontario	16.77	-0.32	0.17	0.29	93.88	12.49	0.39	0.24	-0.15	99.43
Manitoba	-11.02	0.90	0.47	0.85	74.11	5.05	0.49	0.47	0.09	79.43
Saskatchewan	- 3.63	0.56	-	0.80	52.73	40.40	-1.92	0.31	-	73.52
Alberta	26.57	-0.87	0.21	-	50.07	11.29	1.16	0.17	0.24	92.14
British Columbia	1.17	0.74	0.26	0.20	72.83	- 3.82	1.26	-0.27	0.27	95.82
Canada	26.20	-	-0.87	0.37	91.23	-60.38	5.04	-0.07	-0.17	97.45

Source: Calculated from data XXXIX to XLIX

TABLE XV

ELASTICITY COEFFICIENTS OF PROPERTY TAX REVENUES,
BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1947 - 1956					1957 - 1966				
	Constant	Popula-tion	Per capita disposable income	Provincial education grant	R^2	Constant	Popula-tion	Per capita disposable income	Provincial education grant	R^2
Prince Edward Island	-10.98	1.04	0.69	0.58	97.70	- 2.56	0.46	1.32	0.16	95.36
Nova Scotia	-27.20	2.22	1.97	-	96.34	-12.22	1.08	0.02	0.86	98.01
New Brunswick	- 4.95	0.31	1.84	0.30	98.21	- 0.72	0.09	1.56	0.34	98.72
Quebec	3.4	-0.15	1.89	0.24	99.08	-14.85	1.12	2.72	-0.17	95.69
Ontario	- 2.89	-0.16	0.99	0.93	99.76	-11.50	1.56	-0.53	0.55	97.06
Manitoba	-23.21	2.40	0.55	0.20	95.09	-20.31	2.02	0.90	0.19	95.33
Saskatchewan	- 6.13	0.75	0.17	0.72	96.89	4.31	0.26	0.29	0.43	94.97
Alberta	-40.00	4.42	0.51	-0.47	96.30	-18.75	1.81	0.65	0.35	97.77
British Columbia	- 4.23	0.08	3.90	-0.47	94.49	- 6.41	-0.06	0.59	1.17	99.23
Canada	-39.09	3.81	0.89	-0.15	99.46	-21.20	1.26	0.42	-0.67	99.67

Source: Calculated from data in Tables XXXIX to XLIX

occasions is the absolute value of the grants coefficient
greater than unity and in one of these cases, Prince Edward
Island in 1930-39, it is negative (-1.79). In the subse-
quent time span, 1940-46, Prince Edward Island's coefficient
is still greater than one but becomes positive (1.57).

The incidence of negative grant elasticities is quite
limited even during the 1930-39 period. Although, at least
one negative elasticity is evident in each of the sub-periods.
According to Tables XVI and XVII no grants elasticity
greater than 0.77 is observed in the extended time periods,
including the total period considered in the study.
However, as the time span for which data is used to compute
the elasticity is reduced by omitting the earlier time
intervals there is a general decline in the elasticity
coefficients. Thus, the period 1947-66 tends to have grant
elasticities which are not as high as those indicated for
the periods 1940-66 and 1930-66.

In conclusion, no specific trends may be discerned
for any one province with respect to the various
elasticities considered in this section. However, a certain
overall directionality of change in the elasticities is
observable over time. While population elasticities show a
general decline, income elasticities exhibit a reverse trend.
In the case of the grant elasticities, very little change is
observable but what does exist favors an overall lowering of
the coefficient.

TABLE XVI

ELASTICITY COEFFICIENTS OF PROPERTY TAX REVENUES, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 – 1966					1940 – 1966				
	Constant	Population	Per capita disposable income	Provincial education grant	R^2	Constant	Population	Per capita disposable income	Provincial education grant	R^2
Prince Edward Island	- 0.78	0.18	0.23	0.77	97.69	- 8.50	0.89	0.74	0.50	98.97
Nova Scotia	-19.98	2.22	-0.51	0.60	92.00	-53.63	4.75	0.70	0.07	95.04
New Brunswick	24.30	-1.94	1.86	0.33	25.91	-38.31	3.56	0.80	0.13	95.94
Quebec	-15.17	1.90	-0.41	0.41	96.06	-25.75	2.53	0.23	0.20	97.32
Ontario	-29.52	2.99	-0.33	0.24	94.42	-39.32	3.56	0.75	-0.13	96.53
Manitoba	- 3.54	0.93	0.06	0.45	98.13	- 8.02	1.26	0.24	0.37	98.22
Saskatchewan	1.07	0.41	0.06	0.05	97.98	- 0.64	0.56	0.33	0.47	98.27
Alberta	- 7.18	1.35	0.11	0.29	98.35	-15.91	2.05	0.47	0.08	98.54
British Columbia	- 9.38	1.41	-0.30	0.52	97.09	-19.20	2.23	0.12	0.23	96.36
Canada	-10.42	1.33	-0.48	0.59	97.95	-21.60	2.11	-0.17	0.39	97.82

Source: Calculated from data in Tables XXXIX to XLIX

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TABLE XVII

**ELASTICITY COEFFICIENTS OF PROPERTY TAX REVENUES,
BY PROVINCE AND SELECTED TIME PERIODS**

1947 - 1966

PROVINCE	Constant	Population	Per capita disposable income	Provincial education grant	R^2
Prince Edward Island	- 0.44	0.12	1.32	0.29	98.59
Nova Scotia	-30.17	2.49	1.67	0.09	98.84
New Brunswick	-22.47	1.83	1.49	0.28	99.37
Quebec	-22.00	1.86	1.70	0.0	99.18
Ontario	-13.31	1.05	1.81	0.15	99.08
Manitoba	-14.28	1.58	0.82	0.23	98.71
Saskatchewan	- 4.60	0.88	0.23	0.48	98.07
Alberta	-23.13	2.63	0.76	-0.09	97.79
British Columbia	-22.02	1.86	2.40	-0.25	97.33
Canada	- 8.38	0.85	1.16	0.32	99.57

Source: Calculated from data in Tables XXXIX to XLIX

III. ELASTICITY OF THE PROPERTY TAX BASE

The second phase of the empirical analysis of
property tax revenues is concerned with the responsiveness
of the value of the property tax base with respect to
changes in population and per capita disposable income.
Since real property constitutes the major portion of the
property tax base in the provinces concerned, then the
value of land and structures is used as the tax base. One
major difficulty with a tax base of this nature is the
calculation of its value. Not only does the method used to
determine the value of the real property affect the absolute
value of the elasticities but also the ability to make
inter-provincial comparisons.

The most common measure of real property is its
assessed value according to prescribed criteria which vary
from province to province. The most reliable measure is
the market value of the real estate but the difficulties
outlined in Chapter III point out the practical limitations
of this approach. Though it is recognized that the use of
assessed values for the computation of property tax base
elasticities is limited, the absence of estimates of market
values of property tax on a provincial basis leaves no
other alternative open. Therefore, the elasticities of the
property tax base on a provincial level use the assessed
values of the base. This part of the study is limited to
an examination of seven of the provinces. Newfoundland is

not considered because of the fact that property tax
revenues are not used extensively for public education.
The provinces of Prince Edward Island and Quebec are
omitted because of imcomplete data regarding the total
assessed value of real property. Because of the absence of
complete data and the different methods used to assess the
value of real property it is impossible to compute
elasticities of the assessed value of the property tax base
on a national level.

Correlation coefficients for the property tax base.
In keeping with previous practice, the correlation
coefficients between the provincial assessed values of the
property tax base and the independent variables, population
and per capita disposable income for the basic time
intervals are presented in Table XVIII. The simple
correlation coefficients for the three most recent time
periods indicate a stability of direction and the existence
of a level of constancy in the relationships over time. The
only exception of any note is the negative correlation with
per capita disposable income (-0.85) for Saskatchewan in
1940-46.

In the earlier period, 1930-39, eight of the
correlations are not significant and those that are, tend to
be negative. As contrast, the lowest correlation in the two
most recent time periods is 0.84 with the exception of
Saskatchewan again which had a coefficient of 0.60 in

1947-56. The elasticity coefficients which represent the responsiveness of total provincial assessed property values with respect to changes in population and disposable income per capita for the four sub-periods are given in Tables XIX and XX. The independent variables used as predictors account for between 57 per cent and 99 per cent of the variance of the tax base in the last three periods analysed. These values indicate that in most cases the model is a satisfactory predictor of changes in assessed property values.

Population elasticity of the tax base. The level of response of the assessed value of a province's real property with respect to a one per cent change in its population is indicated by this coefficient. Only four elasticities are recorded as significant for 1930-39. The range of these coefficients extends from a minimum value of -3.28 for British Columbia to a maximum of 2.05 for Nova Scotia. In subsequent time spans, the only negative population elasticity is recorded by New Brunswick (-0.51) in 1957-66. In general, the elasticities during the two most recent sub-periods tend to be greater than unity but no higher than 3.60 (British Columbia, 1957-66). The only provincial trend with respect to time is the discernible increase in the population coefficients for British Columbia.

In contrast, the elasticities for extended periods of time (Table XXI) tend to be higher than the elasticities

TABLE XVIII

CORRELATIONS OF ASSESSED PROPERTY VALUES WITH POPULATION AND DISPOSABLE
INCOME PER CAPITA, BY SPECIFIED PROVINCES AND SELECTED TIME PERIODS

PROVINCE	Population				Disposable income per capita			
	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966
Nova Scotia	.71	.96	.92	.90	.53*	.97	.95	.95
New Brunswick	-.49*	.80	.95	.84	-.29*	.88	.99	.99
Ontario	-.74	.97	.98	.97	-.36*	.85	.93	.95
Manitoba	-.65	.29*	.95	.94	-.09*	.95	.92	.97
Saskatchewan	.39*	.89	.89	.90	-.56	-.86	.60	.91
Alberta	-.71	.27*	.99	.98	.36*	.77	.85	.93
British Columbia	-.87	.97	.98	.96	-.33*	.88	.93	.90

*Not significant at 0.10 level.
Source: Calculated from data in Tables XXXIX to XLIX

computed for the shorter time intervals. Thus, in contrast
to the elasticities just described, the majority of these
values range from 2.00 to 5.70 in the periods 1930-66 and
1940-66. The population elasticities for 1947-66 are
considerably less and extend in value from 1.75 to 3.31.
Thus, whether relatively short or long time periods are
considered, the assessed value of property is quite
sensitive to changes in population.

Income coefficients of the tax base. The income
elasticities in Tables XIX and XX which indicate the
responsiveness of total provincial assessed real property
values to changes in disposable income per capita are
considerably less than the corresponding population
coefficients. However, the values of the income
coefficients of a majority of the provinces do increase as
the time period for which the elasticities are computed
becomes more current.

In the two most recent time spans, the income
elasticities of the provinces west of Quebec have relatively
low elasticities that range from -0.69 to 0.87. The two
Maritime provinces exhibit elasticities which are somewhat
larger and range from 1.32 to 2.03, during the same two
periods. The earlier time intervals of 1930-39 and 1940-46
maintain a narrower range of elasticities which fluctuate
around zero. Although the majority of elasticities are
positive, British Columbia in all of the sub-periods

TABLE XIX

ELASTICITY COEFFICIENTS OF ASSESSED PROPERTY VALUES, BY SPECIFIED PROVINCES AND SELECTED TIME PERIODS

PROVINCE	1930 – 1939				1940 – 1946			
	Constant	Popula-tion	Per capita disposable income	R^2	Constant	Popula-tion	Per capita disposable income	R^2
Nova Scotia	– 9.77	2.05	0.28	58.25	13.31	0.37	0.09	92.20
New Brunswick	–	–	–	–	– 9.55	1.98	0.39	82.11
Ontario	–	–	–	–	–	1.06	-0.06	94.01
Manitoba	53.91	-0.63	–	40.75	17.30	0.16	0.07	95.61
Saskatchewan	–	–	–	–	10.20	0.79	-0.08	79.37
Alberta	40.38	-1.55	0.13	64.36	18.86	–	0.19	57.66
British Columbia	66.70	-3.28	-0.37	80.32	7.91	0.94	-0.15	92.83

Source: Calculated from data in Tables XXXIX to XLIX

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TABLE XX

ELASTICITY COEFFICIENTS OF ASSESSED PROPERTY VALUES, BY SPECIFIED PROVINCES AND SELECTED TIME PERIODS

PROVINCE	1947 – 1956				1957 – 1966			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Nova Scotia	-10.18	1.35	1.71	90.10	-24.35	2.52	1.53	91.95
New Brunswick	8.02	0.21	1.32	97.12	12.85	-0.51	2.03	99.10
Ontario	-19.09	2.65	0.06	95.36	-7.67	1.75	0.42	95.35
Manitoba	-10.63	2.00	0.53	92.87	-5.20	1.43	0.87	96.60
Saskatchewan	0.05	0.37	0.09	77.41	-6.81	1.84	0.34	88.73
Alberta	-10.34	2.18	0.13	97.87	-12.67	2.07	0.66	97.65
British Columbia	-24.88	3.34	-0.22	96.52	-24.96	3.60	-0.69	91.60

Source: Calculated from data in Tables XXXIX to XLIX

maintains a negative response to changes in per capita disposable income.

Similar trends are observed in Table XXI which presents the elasticities for the extended time periods. No discernable differences may be observed in contrast to the elasticities of the sub-periods. The income coefficients of the two Maritime provinces are generally higher than those for the other provinces in all the extended time periods. Furthermore, the income coefficient values of British Columbia is consistently negative. Finally, the contrast in comparative values between the income and population coefficients is also evident, with the assessed value of the tax base being much more sensitive to changes in population.

The manner by which real property is assessed differs from province to province thus raising questions about the ability of the same variables to predict assessed values successfully in the various provinces. Such questions are groundless, particularly with regard to the last two sub-periods where the independent variables account for more than 90 per cent of the variance of the assessed value of real property in all provinces, except Saskatchewan in which no less than 77 per cent of the dependent variable is accounted for.

TABLE XXI

ELASTICITY COEFFICIENTS OF ASSESSED PROPERTY VALUES,
BY SPECIFIED PROVINCES AND SELECTED TIME PERIODS

PROVINCE	1930 - 1966				1940 - 1966				1947 - 1966			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Nova Scotia	-41.08	4.47	0.12	76.97	-60.30	5.70	0.53	90.26	-36.90	3.31	1.80	97.35
New Brunswick	49.06	-3.54	2.54	14.23	-14.11	2.07	0.96	96.61	7.83	-	1.78	98.53
Ontario	-15.11	2.50	-0.16	95.28	-15.22	2.42	0.03	97.95	-9.03	1.75	0.61	98.30
Manitoba	-22.01	3.10	0.04	87.32	-16.03	2.47	0.40	95.41	-11.88	1.94	0.84	98.42
Saskatchewan	-13.86	2.50	0.07	79.75	-16.67	2.66	0.14	90.77	-17.24	2.66	0.21	93.43
Alberta	-11.81	2.38	-0.05	96.02	-10.79	2.20	0.14	98.85	-10.19	2.04	0.37	99.05
British Columbia	-21.31	3.56	-1.13	79.15	-25.15	3.62	-0.71	97.14	-24.38	3.31	-0.22	98.87

Source: Calculated from data in Tables XXXIX to XLIX

IV. ELASTICITIES OF THE ESTIMATED MARKET
VALUE OF REAL PROPERTY IN CANADA

Real property is the mainstay of the property tax
base but its exact value is not known and can only be
estimated on the basis of the worth of the land and
structures that are used as the real property tax base. The
estimates used in this study although made on a nationwide
level are disaggregated according to the use of the real
property. The three components of property employed are
real property used for (1) agricultural, (2) industrial,
and (3) residential purposes. The responsiveness of each
of these types of real property to changes in population
and per capita disposable income are computed for selected
time intervals as reported in Table XXII.

The responsiveness of all three types of real
property is more sensitive to changes in population during
most of the time periods than to changes in per capita
disposable income. However, the sign of the population
elasticities fluctuates between the short time periods. In
contrast, the coefficients for the extended time periods
are all positive. The income coefficients in most of the
time periods are less than unity. The most notable
exceptions occur in 1957-66 when the values of income
elasticities for agricultural and residential real property
are 4.41 and -6.98 respectively. It may also be observed
that industrial and residential property elasticities tend
to be slightly greater than those of agricultural real

TABLE XXII

ELASTICITY COEFFICIENTS OF ESTIMATED MARKET VALUE OF REAL
PROPERTY IN CANADA, FOR SELECTED TIME PERIODS

TIME PERIOD	AGRICULTURAL REAL PROPERTY				INDUSTRIAL REAL PROPERTY				RESIDENTIAL REAL PROPERTY			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
1930-1939	75.26	-3.50	0.60	86.40	38.23	-1.06	0.31	86.63	21.60	-0.14	0.44	93.37
1940-1946	-70.87	5.84	-0.37	76.95	40.40	-1.32	0.66	97.77	-29.42	3.03	0.38	99.21
1947-1956	4.51	0.84	0.60	98.88	-25.43	2.65	0.83	99.96	-6.71	1.28	1.28	99.50
1957-1966	101.38	-6.63	4.41	74.79	8.87	0.60	0.79	99.78	-237.12	18.68	-6.98	50.08
1947-1966	8.79	0.45	0.91	89.38	-4.48	1.27	1.09	97.36	-13.92	1.91	0.83	81.27
1940-1966	-0.99	1.25	0.39	94.65	-10.30	1.71	0.88	98.18	-13.03	1.80	0.95	92.34
1930-1966	-4.91	1.65	0.02	85.99	-16.65	2.27	0.45	97.17	-17.69	2.22	0.63	95.10

Source: Calculated from data in Tables XXXIX to XLIX

property.

V. PROVINCIAL EDUCATION GRANTS

Provincial education grants are those sources of funds used for public education which are derived from the general revenues of the provincial government. This phase of the study employs the stepwise multiple regression procedure in two analyses in order to determine the relationship between changes in these grants and changes in (1) the sources of provincial general revenues, and (2) the factors of economic growth.

Sources of Provincial Revenues

This portion of the study disaggregates the gross general revenues into four broadly interpreted sources: direct tax revenues, federal grants, taxes on commodities, royalties and other revenues derived from the exploitation of natural resources. The purpose of the analysis is to measure the responsiveness of provincial education grants to changes in each of the above sources of a provincial government's general revenues. However, before considering these elasticities a brief comment on the correlations between the dependent variable and the sources of provincial revenues is in order.

Correlation coefficients of provincial grants.

Tables XXIII and XXIV contain the simple correlation

coefficients between provincial education grants and each of
the four sources of general provincial revenues: federal
grants to provinces, revenues from natural resources
royalties, taxes on commodities, and direct tax revenues for
each province on the basis of selected time intervals. In
all cases, the general tendency is for the coefficient to
move towards a unit correlation as the time period observed
is closer to the present day.

The relationship between provincial education grants
and federal grants is rather tenuous for most of the
provinces in the first three sub-periods. In fact, up
until, and including the 1947-56 period, the simple
correlations with this revenue source for the majority of
provinces are not significant. Of those that are
significant, only the coefficient for Manitoba in 1930-39 is
negative. In the subequent period 1957-66, all the
coefficients are significant and only two provinces have
correlations less than 0.90.

Such a condition in the earlier periods does not
exist to the same extent in the case of correlations with
the natural resource royalties. As is quite typical in this
study, the major portion of correlations for the 1930-39
time period are not significant but in more recent time
periods all the correlations, save one, are significant and
in the 1957-66 period only New Brunswick and Quebec
exhibited coefficients less than 0.90.

TABLE XXIII

CORRELATIONS OF PROVINCIAL EDUCATION GRANTS WITH FEDERAL GRANTS, NATURAL RESOURCE REVENUES, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	Federal grants				Natural resource revenues			
	1930–1939	1940–1946	1947–1956	1957–1966	1930–1939	1940–1946	1947–1956	1957–1966
Prince Edward Island	-.02*	.12*	.58	.94	-	-	.94	.94
Nova Scotia	.93	.48*	-.02*	.90	.41*	-.90	.93	.90
New Brunswick	.80	.91	.43*	.75	.69	.94	.70	.75
Quebec	.23*	.82	-.06*	.87	.60	.74	.90	.87
Ontario	-.13*	.46*	-.06*	.91	.45*	.81	.97	.91
Manitoba	-.66	-.46*	-.03*	.97	-.87	.96	.93	.97
Saskatchewan	-.39*	-.26*	.42*	.98	-.25*	.73	.97	.98
Alberta	-.01*	.39*	.69	.99	.06*	.90	.86	.99
British Columbia	-.30*	.19*	.68	.96	.03*	.04*	.83	.96
Canada	-.13*	.71	.36*	.95	.41*	.88	.99	.95

*Not significant at 0.10 level.

Source: Calculated from data in Tables XXXIX to XLIX

TABLE XXIV

CORRELATIONS OF PROVINCIAL EDUCATION GRANTS WITH SALES TAX REVENUES
AND DIRECT TAX REVENUES, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	Sales tax revenues				Direct tax revenues			
	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966
Prince Edward Island	-.13*	.62*	.94	.99	.99	1.00	.91	.85
Nova Scotia	.83	.97	.77	.98	.75	.84	.78	.94
New Brunswick	.82	.96	.86	.70	.86	.73	.77	.49*
Quebec	.77	.85	.92	.98	.82	.54*	.90	.94
Ontario	.54*	.94	.99	.99	.46*	.68	.96	.98
Manitoba	-.39*	.92	.96	.96	-.81	.27*	.94	.84
Saskatchewan	.57	.93	.96	.95	-.38*	.58*	.94	.93
Alberta	.22*	.94	.97	.96	.33*	.94	.93	.94
British Columbia	.05*	.94	.96	.93	.04*	.91	.87	.88
Canada	.64	.95	.99	.99	.43*	.79	.97	.96

*Not significant at 0.10 level.
Source: Calculated from data in Tables XXXIX to XLIX

The pattern of development over time with respect to the correlations of the two major tax sources, sales and direct taxes, is similar to the patterns just described. Not only are many of the coefficients not significant in early periods but the general tendency is to move towards unity with respect to time. One notable exception is the correlation with direct tax revenues for New Brunswick in 1957-66. This correlation (.49) was the only non-significant coefficient in this time period for any of the independent variables considered in this section of the study.

Federal grant elasticities for provincial grants. Tables XXV and XXVI report the coefficients which show the responsiveness of the provincial education grants with respect to changes in federal grants to provinces for the selected time periods indicated in the tables. Most of the elasticities for the 1940-46 period are at variance with those in other time periods. Many of the coefficients in this time interval are greater than unity while the elasticities in the other sub-periods fluctuate about zero elasticity. With the exception of British Columbia in 1947-56, the highest federal grant elasticity coefficient in any of the three periods, other than 1940-46, is 0.53. The lowest value is -0.33. For the most recent time period, the values of the federal grant elasticities vary between 0.44 for Manitoba and -0.17 for Nova Scotia. Thus, the provincial education grants are not very responsive to

changes in federal grants.

The federal grant elasticity coefficients presented in Tables XXVII and XXVIII denote the elasticities of the dependent variables with respect to changes in the independent variable for more extended periods of time than above. The federal grants elasticities for these periods are closer to zero, with no coefficient having a value greater than 0.59. Though some of the coefficients are negative, the absolute values of these particular elasticities are not so great that an increase in federal grants would cause a significant change in the provincial education grants.

Natural resource elasticity of provincial grants. These elasticities depict the reaction of provincial education grants with respect to changes in royalties and rents from the exploitation of a province's natural resources. The most obvious general characteristic about these elasticities is the high proportion of negative coefficients in all the time periods. Furthermore, the coefficients for the periods 1940-46, with values ranging from -10.80 to 4.5, show a greater variance than in the other time periods examined. With the exception of the elasticities for New Brunswick (-1.48) in 1947-56, no natural resource coefficient for the post-war periods exceed the limits of the range -0.49 to 0.89. The range is somewhat less for the 1957-66 time period in which the highest

positive value for the coefficient is 0.26 for British
Columbia whereas the lowest value is identical to that of
the range stated previously, -0.49.

When the time range is extended to include two or
more of the sub-periods in proper sequence, a preponderance
of negative coefficients are not evident (see Tables XXVII
and XXVIII). This change is particularly noticeable for the
time period 1947-66 in which only the natural resource
elasticity coefficient of Alberta (-0.11) is negative.
However, the absolute values are all less than unity except
for Ontario's coefficient of 1.21 for the total time span
under study.

Sales tax elasticity for provincial grants. This
elasticity indicates the degree to which provincial
education grants change with a one per cent change in
revenues from taxes on commodities. The coefficients tend
to be somewhat higher on the average than the elasticities
described above. The provincial education grants of some
provinces for the period 1947-56 are extremely sensitive to
changes in the revenues from commodity taxes, particularly
in the cases of Alberta and Quebec whose coefficients are
5.41 and 4.43 respectively. In contrast, the highest
elasticity coefficient for 1957-66 is New Brunswick's 1.87.
The incidence of negative coefficients is quite limited and
in the most recent time period no negative elasticities are
recorded.

The coefficients for the provinces in combined consecutive time periods are not too different. The same absence of negative coefficients is observed and the some-what higher values of elasticities when compared with the other elasticities is of significance. However, the upper limit in the range for any extended time period does not exceed 2.60 with the exception of the 1947-66 value of 3.48 for New Brunswick. In the same time period the value of the lower end of the range is -0.26.

Direct tax elasticity of provincial grants. Those changes in the provincial education grant that are related to changes in the revenues from direct taxes are reflected in the direct tax elasticity. Such elasticities, tend to indicate a limited effect of changes in this tax on most of the provincial education grants for each of the sub-periods. In all of the time periods, the majority of provinces exhibit direct tax elasticities of less than unity. The relatively high elasticities are the exception rather than the rule and as a consequence no province maintains consistently high coefficients throughout the various time periods. It is particularly noteworthy that the highest elasticity for 1957-66 is 0.67.

Though most of the coefficients for the sub-periods are positive, Table XXVIII shows that in 1947-66 half of the direct tax coefficients are negative. However, the values of the coefficients in a number of provinces

TABLE XXV

SOURCE ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 - 1939						1940 - 1946					
	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2
Prince Edward Island	9.04	-	-	-	0.28	100.00	9.12	-	-	-	0.28	100.00
Nova Scotia	8.38	0.32	-0.24	0.30	-0.08	94.66	3.25	2.03	- 2.12	-0.65	1.29	97.26
New Brunswick	4.83	-0.14	0.16	0.06	0.51	81.80	62.35	2.71	-10.80	3.29	0.73	99.33
Quebec	0.64	-0.13	-1.42	1.21	1.05	94.46	35.47	-3.29	- 4.89	5.89	0.48	98.09
Ontario	15.57	-0.14	-	0.09	0.05	61.82	47.10	1.83	- 0.14	4.00	-7.48	98.82
Manitoba	18.91	0.06	-0.25	-0.11	-0.06	79.16	1.28	0.03	0.75	-0.16	0.29	96.27
Saskatchewan	19.06	0.01	-0.34	0.85	-0.89	89.97	-33.14	1.29	- 2.26	1.47	2.27	98.56
Alberta	-	-	-	-	-	-	-10.06	0.53	0.61	0.25	0.22	97.56
British Columbia	-	-	-	-	-	-	- 3.77	0.26	0.57	0.55	-0.21	99.64
Canada	13.48	-0.13	-	0.27	0.04	64.98	- 2.95	1.50	4.51	0.40	-5.00	99.78

Source: Calculated from data in Tables XXXIX to XLIX

TABLE XXVI

SOURCE ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1947 – 1956						1957 – 1966					
	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2
Prince Edward Island	-10.18	0.49	-0.07	0.46	0.70	93.33	- 4.26	0.18	-0.49	0.66	0.67	98.86
Nova Scotia	-10.13	0.53	0.89	-0.60	0.91	94.46	- 1.32	-0.17	-0.28	1.04	0.37	98.10
New Brunswick	-18.91	0.46	-1.48	3.79	-0.91	85.90	2.53	-0.08	-0.47	1.87	-0.62	76.58
Quebec	- 8.13	-0.33	-0.05	1.12	0.47	86.55	-13.83	0.30	0.16	0.02	0.20	99.82
Ontario	- 6.96	0.05	0.02	0.87	0.37	99.12	- 0.46	0.11	-0.07	0.29	0.66	98.59
Manitoba	-21.83	-	-0.24	2.37	0.05	93.31	7.34	0.44	-0.51	0.73	-0.17	98.56
Saskatchewan	2.57	0.49	0.43	-1.18	1.16	97.34	- 0.78	0.06	-0.49	0.87	0.54	98.82
Alberta	-46.28	-0.11	-0.25	5.41	-1.52	98.20	1.96	0.17	-0.24	0.72	0.25	99.66
British Columbia	7.70	-1.25	0.30	4.43	-3.24	95.39	3.85	0.31	0.26	0.13	0.07	99.07
Canada	-10.35	0.01	0.04	1.35	0.04	98.34	-3.42	0.23	0.20	0.67	0.04	99.85

Source: Calculated from data in Tables XXXIX to XLIX

approach zero elasticity. The incidence of negative coefficients appears to decrease with consequent increases in the time span over which the elasticity is computed. No particular pattern emerges with respect to the value of the coefficients of a province over time.

An important aspect of computing elasticity coefficients of provincial education grants is to find predictors which explain the variance of the dependent variable. The ability of the combined efforts of the four sources of provincial general revenues to predict the provincial education grant in the various provinces is without question. In the three most recent sub-periods examined the independent variables account for at least 92 per cent of the variance of the provincial education grant in each province with the exception of Saskatchewan in which only 81 per cent of the variance of the dependent variable was accounted for in 1957-66. However, these statistical analyses provide no more than a mathematical description of the interrelation of a particular set of independent variables and the dependent variable in a number of selected time periods. Thus, it is possible to select different sets of predictor variables.

Elasticity of Provincial Revenues for Education

In order to provide some relative degree of comparability of both revenue sources the regression analysis technique is repeated to determine the relationship

TABLE XXVII

SOURCE ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 – 1966						1940 – 1966					
	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2
Prince Edward Island	2.35	–	–	–	0.83	100.00	– 4.15	0.50	-0.19	0.08	0.74	98.08
Nova Scotia	-2.00	0.05	-0.24	0.33	0.88	98.74	– 5.14	0.02	-0.01	0.46	0.77	97.72
New Brunswick	-5.39	0.15	0.56	0.62	0.34	93.88	-12.32	-0.37	-0.28	2.60	-0.40	95.05
Quebec	-8.34	0.11	-0.71	1.57	0.31	98.99	-12.34	0.25	-0.03	1.02	0.34	98.48
Ontario	-8.43	0.30	1.21	0.05	-0.02	95.52	– 9.29	-0.38	0.49	2.17	-0.85	98.02
Manitoba	-5.62		-0.54	0.82	0.92	97.72	– 7.94	-0.06	-0.07	0.90	0.61	98.20
Saskatchewan	-1.87	0.30	0.23	0.51	0.03	96.30	– 3.24	0.41	0.28	0.48	-0.02	99.25
Alberta	-3.84	0.31	0.05	-0.50	1.36	97.75	– 8.65	0.24	–	0.10	1.15	98.10
British Columbia	-1.12	0.32	0.35	0.77	-0.43	98.21	– 2.95	0.07	0.08	0.11	0.73	99.13
Canada	-5.19	0.07	0.14	0.13	0.06	98.30	– 9.70	0.11	0.22	1.37	-0.29	99.46

Source: Calculated from data in Tables XXXIX to XLIX

TABLE XXVIII

SOURCE ELASTICITY COEFFICIENTS OF PROVINCAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

1947 - 1966

PROVINCE	Constant	Federal grants	Natural resources	Sales taxes	Direct taxes	R^2
Newfoundland	0.68	0.25	0.05	0.90	-0.27	97.43
Prince Edward Island	- 6.25	0.12	0.03	0.88	0.31	98.48
Nova Scotia	- 9.94	0.28	0.92	0.35	0.15	97.28
New Brunswick	- 7.45	-0.27	0.83	3.48	-1.19	87.14
Quebec	-16.51	0.25	0.33	0.96	0.29	98.39
Ontario	- 4.68	0.04	0.18	0.56	0.43	99.59
Manitoba	- 8.89	-0.19	0.21	1.50	-0.08	96.47
Saskatchewan	3.11	0.59	0.48	-0.26	-0.04	99.03
Alberta	-21.45	-0.06	-0.11	1.54	0.79	96.35
British Columbia	- 3.25	0.27	0.27	1.07	-0.49	97.95
Canada	- 5.22	0.28	0.32	0.31	0.33	99.47

Source: Calculated from data in Tables XXXIX to XLIX

between the changes in provincial education grant and changes in per capita disposable income, and population. Before examining the elasticities a few remarks concerning the simple correlations are a pre-requisite.

Correlation coefficients with population and income. The simple correlation coefficients between provincial education grants per capita and population or disposable income per capita for each province in the selected time periods are given in Table XXIX. The number of non-significant correlations, with each independent variable in a time period reduces as the specific time period is closer to the present day.

The significant simple correlations with population maintain a positive direction and approach unity in the more recent sub-periods. For 1957-66, nine of the provinces exhibit population correlation coefficients of 0.91 or better. A similar situation exists with respect to income correlations. Seven of the provinces have coefficients greater than 0.90 in the same time interval.

The elasticity coefficients of the provincial education grant with respect to population and per capita disposable incomes are presented in Tables XXX and XXXI for the selected time spans. These elasticities are derived by the stepwise multiple regression technique and are described below.

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TABLE XXIX

CORRELATIONS OF PROVINCIAL EDUCATION GRANTS WITH POPULATION AND DISPOSABLE
INCOME PER CAPITA, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	POPULATION				PER CAPITA INCOME			
	1930-1939	1940-1946	1947-1956	1957-1966	1930-1939	1940-1946	1947-1956	1957-1966
Newfoundland	-	-	-	.97	-	-	-	.96
Prince Edward Island	.23*	-.02*	.79	.94	-.11*	.92	.92	.94
Nova Scotia	.87	.78	.85	.90	.05*	.93	.85	.97
New Brunswick	.83	.71	.84	.78	.43*	.89	.88	.66
Quebec	.50*	-.31*	.91	.96	.38*	-.26*	.87	.96
Ontario	.24*	.74	.98	.97	.48*	.69	.97	.97
Manitoba	-.29*	.16*	.95	.89	-.02*	.90	.85	.86
Saskatchewan	-.51*	-.56*	.80	.90	.63*	.67	.61	.90
Alberta	.10*	.55*	.98	.97	.36*	.86	.80	.88
British Columbia	-.16*	.90	.92	.98	.40*	.84	.92	.93
Canada	.06	.93	.95	.99	.58	.81	.99	.97

Source: Calculated from data in Tables XXXIX to XLIX

Population coefficient of provincial grants. This elasticity is a measure of the responsiveness of the provincial education grants with respect to changes in population. Only two significant population elasticities are recorded for 1930-39, both of which are positive. The values of both the coefficients are greater than two. In the 1940-46 time interval not only are seven of the provincial elasticities significant but the range of values extends from -0.97 to 11.76.

The population elasticity coefficient of 23.26 for the nation as a whole in the same time interval is the largest value computed in this study. In the post-war period no population elasticity is less than 1.96 with the exception of the 1947-56 values for Prince Edward Island (1.11) and New Brunswick (-0.41). The highest value attained in either of the two time intervals is 6.87 which is computed for Saskatchewan in the 1947-56 time span.

The population elasticities of the longer time span presented in Table XXXII indicate, in the same manner as above, that in most provinces the provincial education grant is very sensitive to changes in population. Furthermore, the sensitivity appears to increase with the inclusion of additional conseutive time intervals.

Income coefficients of provincial grants. This coefficient indicates the percentage change in the provincial grants with every one per cent change in the per

TABLE XXX

**ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS**

PROVINCE	1930 - 1939				1940 - 1946			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Prince Edward Island	-	-	-	-	- 5.81	1.42	0.37	96.10
Nova Scotia	-37.23	3.94	-0.26	80.02	14.89	-0.97	1.97	87.57
New Brunswick	-19.86	2.44	0.24	77.64	- 10.20	1.34	1.04	79.22
Quebec	-	-	-	-	-	-	-	-
Ontario	-	-	-	-	-162.29	11.76	-	51.43
Manitoba	-	-	-	-	1.73	0.68	0.50	82.72
Saskatchewan	11.93	-	0.63	40.33	-	-	-	-
Alberta	-	-	-	-	- 30.68	3.05	0.62	83.87
British Columbia	-	-	-	-	- 9.62	1.84	-0.10	79.07
Canada	13.87	-	0.58	33.42	- 21.42	23.26	-1.47	93.47

Source: Calculated from data in Tables XXXIX to XLIX

TABLE XXXI

**ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION
GRANTS, BY PROVINCE AND SELECTED TIME PERIODS**

PROVINCE	1947 - 1956				1957 - 1966			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Newfoundland	-	-	-	-	-29.16	3.02	0.94	95.35
Prince Edward Island	12.93	-1.11	2.08	85.84	-60.12	5.61	1.45	93.77
Nova Scotia	-26.52	2.58	1.16	74.38	-21.48	1.93	1.71	96.08
New Brunswick	- 3.35	-0.41	3.68	77.45	-39.38	4.17	0.00	59.60
Quebec	-81.46	6.68	-0.51	83.54	-79.54	5.12	2.63	94.98
Ontario	-21.15	2.13	0.87	98.27	-40.46	2.83	2.04	96.57
Manitoba	-79.18	1.96	0.77	89.71	-58.98	4.92	1.13	82.00
Saskatchewan	-81.93	6.87	0.57	74.96	-48.69	4.41	0.73	89.30
Alberta	-56.82	5.36	-0.12	95.83	-19.45	2.50	0.28	94.24
British Columbia	-25.74	2.13	1.76	86.83	-38.48	4.20	-0.50	94.92
Canada	-12.69	3.98	-0.09	98.82	-40.12	4.91	0.97	99.37

Source: Calculated from data in Tables XXXIX to XLIX

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capita disposable income of the province, all other
variables being constant. The most noteworthy observation
regarding these elasticities is the generally lower level of
values when compared with those of the corresponding
population coefficients. This is particularly noticeable
in the 1930-39 period where 0.63 is the highest income
coefficient compared to the highest population coefficient
of 3.94. As a consequence, the variance in the range of
coefficients in any time interval is not as great for the
income elasticity coefficients as for the population
elasticities.

The greatest range of elasticities occurs in the
1947-56 period and extends from New Brunswick's high of 3.68
to a low recorded by Quebec of -0.51. The fact that these
elasticities are lower than their counterparts indicates
that though provincial education grants are sensitive to
changes in per capita disposable income they are much more
sensitive to population changes. The same pattern prevails
for the elasticities computed over more extended time
periods but the differences between the two groupd of
coefficients are not as distinct.

The ability of these independent variables to predict
the changes in the provincial education grants is not as
consistently high for all the provinces as with the four
sources of general provincial revenues. In the most recent
time interval, 1957-66, changes in population and per capita

TABLE XXXII

ELASTICITY COEFFICIENTS OF PROVINCIAL EDUCATION GRANTS, BY PROVINCE AND SELECTED TIME PERIODS

PROVINCE	1930 - 1966				1940 - 1966				1947 - 1966			
	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2	Constant	Population	Per capita disposable income	R^2
Newfoundland	-	-	-	-	-	-	-	-	-43.60	4.25	0.69	98.70
Prince Edward Island	-42.68	4.40	0.90	88.34	-49.17	4.74	1.31	94.10	-27.45	2.44	2.02	96.31
Nova Scotia	-30.18	2.58	1.67	95.24	-12.00	0.78	2.56	96.19	-24.63	2.14	1.76	95.95
New Brunswick	-34.64	3.12	1.31	92.66	-26.64	2.24	1.87	98.05	-48.24	4.67	0.32	74.91
Quebec	-95.88	7.13	0.53	36.42	-64.55	3.89	3.18	33.41	-65.12	4.68	1.57	94.69
Ontario	-36.02	2.88	1.32	96.38	-22.79	1.58	2.29	95.79	-31.82	2.52	1.53	96.63
Manitoba	-65.38	5.46	0.97	92.84	-49.86	3.91	1.77	95.20	-58.05	4.53	1.75	95.13
Saskatchewan	-69.40	5.64	1.22	88.26	-84.41	6.62	1.42	87.63	-101.59	8.08	1.04	83.53
Alberta	-50.71	4.53	0.63	97.41	-47.54	4.12	1.00	97.49	-54.58	5.17	-0.05	96.72
British Columbia	-34.22	3.48	0.28	95.10	-26.14	2.28	1.53	96.98	-25.93	2.32	1.41	95.94
Canada	-49.09	3.67	1.05	97.19	-35.81	2.51	1.89	98.02	-36.85	2.58	1.88	97.47

Source: Calculated from data in Tables XXXIX to XLIX

disposable income accounted for anywhere between 82.00 per cent to 99.37 per cent of the variance in provincial education grants, depending on the province, if the R^2 value of 59.60 for New Brunswick is considered exceptional. However, the level of prediction in this case is acceptable for the purpose of comparing the effect of changes in both population and per capita disposable income on the two basic sources of revenues for public education, property tax revenues, and provincial education grants.

CHAPTER VI

ECONOMIC PROGRESS AND FINANCIAL SUPPORT
FOR PUBLIC EDUCATION

I. INTRODUCTION

Although this chapter is restricted to an examination
of the revenue side of public school finance, it must be
kept in mind that the productivity of the sources of revenue
is, to some degree, relative to the growth in expenditures.
If for example, the growth in public education expenditures
is less than the increase in revenue derived from the real
property tax, it would be pointless to be concerned about
the financial support of education. However, implicit in
the observation that provincial governments have become
increasingly involved in the financial support of public
education is the need to examine the revenue side of school
finance in Canada, particularly the ability of the property
tax to provide revenues for education in the future. This
ability is dependent to a large degree on the responsiveness
of property tax base and revenues to the rate of economic
progress in each province.

One of the most confounding aspects in selecting
measures of economic growth is the multiplicity of its
manifestations. Hood and Scott (1957, p. 7) in a partial
list of measures of economic progress include such variables
as increases in output and population, the stock of real
assets with which to work and save, output per head, the

quality of goods, leisure, literacy, the necessity for hard physical labour, and the incidence of slum conditions. It is fairly easy to quantify the changes in economic growth for some of its dimensions, but it is more difficult for others and impossible for others. It is therefore evident that a unique measure of economic growth is impossible and that its effect on education finance must be studied in its many dimensions.

Despite some limitations, one of the more common measures of a region's economic growth, and the one employed in this study, is an increase in aggregate income. Such changes in aggregate income which are derived from an increase in productive capacity may be as a result of improved technology, a growing work force, or some combination of both these factors. In an attempt to examine the effect of each of these factors of economic growth on educational revenues it is necessary to employ measures for these variables. Changes in disposable income per capita is used to represent changes in economic growth due to technological progress. Population growth is employed as a measure of the effect of the work force on economic growth. On the basis of this selection of representative variables, the statistical record of public education finance with respect to changes in economic growth has been reviewed in Chapter V. The basic purpose of this chapter is to discuss the pattern that is perceived in these statistical records.

An equally important part of this study is to determine whether a systematic relationship exists between the levels of revenues raised for public education and the sources used by provincial and local governments to acquire their general revenues. Thus, part of the interpretation of the findings for each time period involves consideration of the effect of changes in revenue sources on the fiscal support for education.

To provide some direction and to facilitate the interpretation of the statistical findings, the discussion of the effects of economic growth on the financial support of education in each of the successive time periods is limited to consideration of the following crucial questions:

1. How sensitive are property tax revenues and provincial education grants to changes in factors of economic growth?

2. How does the property tax base respond to changes in the factors of economic growth?

3. Do provincial education grants reduce the need for property tax revenues?

4. Is there a systematic relationship between provincial education grants and the sources of revenue used by provincial governments?

II. THE DEPRESSION YEARS, 1930-39

In Canada, economic progress, as elsewhere, follows an irregular pattern over time. Economic growth has been much more rapid in some decades than in others. This particular period may be used as an example of the effects on the support for public education when the economic system is depressed. North America, in the early part of 1930-39 experienced the worst depression within recent living memory from which neither Canada nor the U.S.A. had completely recovered by 1939. During this period, the collapse of the economic system combined with increases in population resulted in a sizeable reduction in per capita disposable income and per capita educational expenditures.

At the onset, it must be stated that the comments made about this decade which are based upon the observations in this study must be limited by the lack of significant findings in the case of some provinces. Not only does the rate of economic progress change over time but it is also unevenly distributed throughout the country as a whole. More non-significant correlations and regression weights are evidenced in this time interval than for any other. If the relationships in the subsequent time periods may be considered as normal then it must be concluded that the forces of a depression tend to destroy, to a large degree, relationships that exist between economic variables under more favorable circumstances. No matter what reasons might

be proposed for this phenomonen, the consequences of it for this study remain the same. In the particular period, 1930-39, it is impossible to consider all of the questions mentioned above for any one province or for the country as a whole. Therefore, the comments to be made will be restricted to very broad generalizations which will attempt to provide an explanation of the lack of funds for education.

The elasticities of the revenue of a tax combines the effects of adjustments to either the tax rate or the tax base. Therefore, although revenue elasticities are useful to indicate, in a general manner, the effect of the level of economic activity on the change in revenues, it is necessary to attempt to separate the effect of rate and base changes on the tax revenue. Since the public is extremely critical of changes in the rate structure it is essential to determine how the tax base or source reacts to changes in levels of economic progress.

During the decade of the thirties, education per se, was conceived more as a consumption-type good rather than an investment. This attitude to education is partially supported by the small percentage of students graduating from high school, the low age at which attendance at public schools was compulsory and the limited demand for education as indicated by the elasticities of educational expenditures. Although, the low demand may also be attributed to the lack of sources of revenue.

In this era, the growth in assessed property values was at an extremely low level which is indicated by the elasticities of the assessed real property values of the provinces. To interpret these elasticities it is essential to be aware of the significance of the arithmetic sign of their values. A negative elasticity indicates that any increase in the independent variable will produce a consequent decrease in the dependent variable and vice versa. With positive elasticities, a direct relationship exists since an increase or decrease in the independent variable produces an identical change of direction in the dependent variable. Consequently, a negative population elasticity of assessed real property value indicates a decrease in real property value with the continued population growth. Since disposable income per capita decreased during this decade the positive income elasticities reinforce the seriousness of the effect of the depression on the growth of the property tax base.

The disaggregation of the estimated market value of real property at the national level by type of property permits an evaluation of the degree to which the various types of property were depressed. The elasticities computed with this data (see Table XXII), indicate that those public school systems dependent on revenues from a property tax base consisting of mainly agricultural real property suffered the most with respect to lack of funds in the

depression era. Education systems in highly residential areas should have suffered the least.

If the effective tax rate had remained constant or diminished over this period then the lack of funds would have been much greater. However, Table XXXIII, which consists of the effective tax rates on a national level for each of the years included in the study, indicates that the effective rate between 1930 and 1939 showed a steady increase from 0.52 per cent to 0.60 per cent. This change amounts to a 16 per cent increase in the effective rate over the ten year period.

The combination of the effects of increased tax rates and depressed value of real property is expressed in the elasticities of the revenues of the property tax. These elasticities indicate that the property tax revenues were not severely affected by the decline in incomes as has been suggested by its critics. It would suggest that, though the tax base was severely eroded during this decade, the increase in the tax rate prevented a lower financial support of public education at the local level.

The educational grants provided by most provincial governments, at that time, were not significant by present day standards. This lack of provincial support was often justified on the basis that such provincial grants would encourage school boards to lighten the load of local taxation. With the exception of Prince Edward Island, which had the highest level of provincial support, the reverse

TABLE XXXIII

EFFECTIVE PROPERTY TAX RATE ON NATIONWIDE LEVEL FOR EACH YEAR BETWEEN 1930-66

Year	Annual effective tax rate %	Year	Annual effective tax rate %
1930	0.51	1949	0.48
1931	0.55	1950	0.51
1932	0.59	1951	0.51
1933	0.58	1952	0.53
1934	0.58	1953	0.54
1935	0.56	1954	0.59
1936	0.57	1955	0.57
1937	0.54	1956	0.58
1938	0.59	1957	0.63
1939	0.61	1958	0.65
1940	0.59	1959	0.72
1941	0.57	1960	0.77
1942	0.54	1961	0.78
1943	0.53	1962	0.82
1944	0.55	1963	0.88
1945	0.52	1964	0.59
1946	0.51	1965	0.97
1947	0.47	1966	1.03
1948	0.46		

Source: Calculated from data in Tables XXXIX to LI

situation seemed to occur. Not only did provincial grants provide funds for public education but they also encouraged the raising of additional funds through local taxation. Thus, even under extremely adverse economic conditions, the provision of grants by a higher level of government does not necessarily lighten the tax load of the lower level of government by a substitution effect.

However, the above situation is not the general role of grants. The elasticities of provincial grants with respect to the sources of provincial revenues (see Tables XXV and XXVI) indicate that funds for education provided by some provincial governments were negatively affected by federal grants. In general, no one revenue source dominantly affected the provincial education grants, with the exception of Quebec. Any increases in education grants in Quebec were particularly dependent upon increased sales and direct taxes.

In conclusion, though the property value diminished in both real and assessed terms during this decade, the increased tax rates prevented to some degree a greater loss in property tax revenues for public education. Provincial education grants, though small by present day standards, did not adversely affect the local tax burden in the provinces recorded, with the exception of Prince Edward Island. In general, no provincial education grants were especially sensitive to any particular source of provincial revenues. However, both property tax revenues and

provincial education grants were more responsive to factors of population growth than changes in income. This is perhaps not surprising since financial support is linked to the demand for education, which is partly affected by increases in population growth.

III. THE WORLD WAR PERIOD, 1940-46

This period presents some marked contrasts when compared to the previous era. The advent of World War II produced a significant effect on the level of economic progress in Canada and is often considered to be the greatest single factor to account for the economic revival of the country. This change and its effect on the financial support of public education is reflected to some degree in the statistical data presented in the previous chapter. During this period, not only did both population and per capita disposable income show an increase but also the prices of many items. Therefore, more revenues were necessary to maintain the same quality of education that existed just prior to the war. In many provinces, the level of quality in education at that time as measured by per capita educational expenditures, was lower than in the early thirties. Thus, increases in revenues were also necessary if the quality of education were to be raised to the earlier level of 1930. If such requirements were met they would be reflected by substantially higher elasticities

of property tax revenues and provincial education grants.
In neither case are the elasticities of these two revenue
sources with respect to the basic factors of economic
growth vastly different from those in the earlier period.
Therefore, it must be concluded that the quality of public
education did not improve substantially from the previous
era.

However, a signifcant change did occur with respect
to the tax base and rate of the property tax. The
elasticities of the value of the tax base, both assessed and
estimated market, indicate that the real property value rose
somewhat during the war. In particular, agricultural and
residential real property registered a more than
proportionate increases with respect to population growth.
This increase was of such a magnitude at the national level
as to produce a decrease in the effective tax rate from
0.60 to 0.51 per cent. If the demand for education had been
great during this time span then the increased expenditures
could have been met by maintaining the higher effective tax
rate.

Provincial education grants were more sensitive to
changes in the sources of provincial revenues than in the
previous era. Federal grants actually encouraged provinces
to increase their level of financial support. The
responsiveness of provincial grants with respect to revenues
from natural resources suggest that if other provincial

revenue sources remained unchanged then increases in non-tax revenues from within the province tended to reduce financial support of the provinces to public education.

To conclude, it would seem that despite the improvement in economic conditions during this period, the responsiveness of the two principal sources of revenue for public education to changes in the factors of economic growth, though relatively high, were only sufficient to recoup some of the losses experienced in the previous decade. Both types of grants did not lighten the tax burden of the respective lower level of government. In most provinces, these grants actually encouraged greater expenditures for public education on the part of the lower levels of government.

IV. THE POST WAR PERIOD, 1947-66

Elasticities based on data taken from short time periods reflect the immediate needs due to past deficiencies or anticipated future needs. The over-estimation of future needs creates a surplus which reduces future needs whereas a low estimate of present needs will increase the demand for revenues in the future. Long term average movements in economic variables tend to cover up such short time fluctuations which makes it more desireable to use long term movements of variables to derive elasticities which may be better predictors of the future. Therefore, rather than deal with the two post war time periods separately it is

proposed to combine then for the purposes of this chapter.

An added reason for this decision is the fact that within this period, Canada experienced the most rapid advance in economic progress in the history of the country. During this period, the per capita gross national product, in constant dollars, expanded at the annual rate of 2.1 per cent compared with 1.5 per cent for the period 1914-50. Furthermore, the annual rate of increase in population changes from 1.4 per cent during the period 1914-50 to 2.5 per cent during the time span 1950-66 (Firestone, 1969, p. 123).

Throughout this period the average demand for education in each of the provinces was extremely high. This increase may be accounted for by a number of reasons which reflect changes in educational policies and attitudes towards education. These changes include the raising of the compulsory attendance age; the greater efforts made to keep students in school after reaching the compulsory age limit; and the growing realization that education is not only a product to be consumed but may also be treated as an investment. If public education is considered as an investment it means that education is both a cause and consequence of economic advancement. Thus, more economic growth may permit more education and more education may speed up economic advancement.

The increased sensitivity of both property tax revenues and provincial education grants to changes in per

capita income indicate the increased consideration given to education as an investment. For economic growth to take place on a continuing basis, an adequate volume of capital investment is required. In previous decades such investments were made in physical assets such as structures, machinery, and equipment. However, the high technological development elasticities of the two main sources of financial support provide evidence that in most provinces an expanding volume of investment is being made in the field of public education in order to help sustain an adequate rate of economic growth.

As educational expenditures have increased in this period the provincial governments' contribution to the financial support of public education has risen significantly. Though an increased proportion of public education expenditures have been financed by provincial education grants there has been no lightening of the tax burden. However, the provincial grant elasticity of property tax revenues has diminished in value which suggests that if provincial governments support a greater proportion of the education costs then the local tax burden may be lightened.

Though both assessed and estimated market values of real property have increased during this period, it was not enough to raise sufficient revenues for the increased costs of education. As a consequence, the effective tax rate in this period showed a substantial increase from 0.47 per cent

in 1947 to 1.03 per cent in 1966. Therefore, despite the
fact that assessed properties were extremely sensitive to
changes in the two principal factors of economic growth, the
growth of assessed values of properties were not sufficient
to produce revenues to meet the rising costs of public
education. Not only did effective tax rates increase but
property tax revenues have contributed a smaller percentage
of funds for public education expenditures.

V. THE EFFECT OF NON-TAX REVENUES ON REVENUE SOURCES

Literature on school finance has indicated that
provincial grants often tend to lighten the burden of school
boards with respect to the provision of financial support
for schools. To date no attempt has been made to subject
this statement to any form of analysis in Canada. However,
the results of the multiple regression analysis on property
tax revenues do help to throw some light on this
controversial topic.

In this analysis, the responsiveness of property tax
revenues with respect to changes in provincial education
grants was included. A positive elasticity with respect to
this variable would suggest that provincial grants act as a
stimulus for the provision of revenues by means of property
taxes. On the other hand, a negative elasticity would imply
that such grants act as a substitute for funds that other-
wise would have to be collected through property taxes. For

the majority of provinces in all the time periods considered,
the provincial grant elasticity of property tax revenues was
positive but not very high. Therefore, it may be concluded
that provincial grants provide some stimulation for the
provision of property tax revenues for educational purposes
but not to any high degree. Perhaps the most noticeable
exceptions, especially in the 1947-66 period are Alberta and
British Columbia. It would appear that in these provinces,
the educational grants have tended to produce a
substitutional effect on the financial support of education
during the post-World War II era. This may be due to the
extensive use of property tax revenues for the provincial
Foundation Programmes.

Atherton (1968, p. 32) has suggested that the receipt
of non-tax revenues and federal grants might influence the
manner in which funds are provided for provincial education
grants. Evidence of such a condition would be obvious in
more recent years, as it is only since World War II that
revenues from natural resources and federal grants have
formed a substantial part of the total revenue of some
provinces. The elasticities derived for the period 1947-66
by the multiple regression analysis of provincial grants
with respect to the four sources of revenues for provincial
purposes; federal grants, natural resources, sales taxes,
and direct taxes are useful in considering this problem.

The federal grant elasticities do not reveal that the
provincial education grants provided by poorer provinces

such as the Maritime provinces are any more dependent on
federal grants than the more wealthy provinces. Further-
more, the provincial grants of wealthier provinces do not
receive any benefits from the greater availability of non-
tax revenues. In fact, provincial grants of both poor and
rich provinces are more sensitive to changes in the tax
sources of revenue than the non-tax sources.

Summary

During the period under study, the elasticities of
both sources of financial support indicate that the
proportion of the nation's resources devoted to education
rose slowly in the period 1930 to 1946. Only when Canada
reached an advanced stage in its technological development
and mass consumption did the need to devote increased
resources to education become apparent. This change is
evident by the increased values of the income elasticities
of both sources of public education revenues, particularly
in the 1947-66 time period.

Though revenues from the property tax have continued
to rise because of their responsiveness to changes in
economic growth, the growth has not been sufficient to keep
up with the increased demand for public education. The lack
of sufficient responsiveness of this source is partially
dependent on the limited growth of the tax base. Though the
property tax base was relatively sensitive to changes in per
capita disposable income, the growth of the base was not

sufficient to contribute the same proportion of revenues for educational purposes. Even with increases in the effective rate of the property tax, the provincial government accepted an increasing proportion of the fiscal responsibility for the operation of public schools. However, a tax rate of 1 per cent of the full value of the property tax cannot be considered a burden at the national level, especially when the benefits of education to the national wealth are made apparent. On the other hand, some regions will bear a greater burden of the education expenses than others, particularly those regions whose tax base is principally agricultural real property.

The growing involvement of provincial governments in public education finance has in no way lightened the tax burden of the school boards. Throughout the whole period under study, it would appear from the elasticity coeffi- cients, that the property tax revenues increased in associ- ation with increased provincial contributions to public education. A similar situation existed with respect to federal grants for provincial governments. On the basis of the elasticity coefficients with respect to sources of general provincial revenues, it would appear that increased federal grants promoted a similar rise in education grants from all the provinces. However, in both cases the increases in revenue sources tended to be less than proportional to the increase in the respective grants. The

important factor is, not the degree of increase produced by these grants, but the fact that they did not lighten the burden of the lower level of government.

It might be assumed that those provincial govern-ments which rely more heavily on non-tax sources for revenue might apply a greater degree of the revenues from these sources to investments in education. This does not appear to be the case. In fact, the province of Alberta, whose revenues are predominantly derived from non-tax sources exhibits a negative elasticity with respect to changes in natural resource revenues during 1947-66. From this elasticity, it would appear that provincial grants decrease with increasing revenues from natural resources, though not to a significant degree. Provincial education grants in the post-war period are most responsive to sales and direct taxes.

The use of time-series data to derive elasticities may account for this pattern of revenue source elasticities. The method used in effect summarizes the data for a period of years and presents an average elasticity coefficient for that time period. Despite the fact that some provinces receive substantial revenues from the rents and royalties derived from the use of natural resources these revenues do tend to fluctuate annually. Consequently, it is not surprising that the natural resource elasticities are low in value and in some cases negative since the coefficient being

an average value must take into account such fluctuations. Sales and direct tax revenues are not subject to such fluctuations but tend to show a continued growth over the years. Therefore, a higher degree of responsiveness by the provincial education grants to changes in sales and direct tax revenues is to be expected.

The elasticity coefficients which represent the responsiveness of educational grants to changes in provincial revenue sources do not reveal any great differences in the promotion of provincial education grants with respect to the level of wealth of a province. This similarity may be accounted for by the fact that the education cost per capita of the poorer provinces is as much as 50 per cent less than those of the rich provinces which is similar to the difference in per capita incomes of these provinces. Despite the fact that many of the poorer provinces receive extended federal aid in the form of transfer payments and special grants, these grants do little to encourage additional expenditures for public education. Thus, the extent to which funds given to provincial governments by the federal government affect changes in provincial education grants is not significantly greater in the less wealthy provinces as might be expected.

Implications for the Future

The need for more financial support of public education increases because either the public or school administrators perceive a growing need for additional revenues. Such needs may be the result of more and varied programs, increased school populations, price changes or the consequences of an increased level of urban living and the concomittant demand for more and better services. Although the estimated market value tax base is growing at a rate more than proportionate with economic growth, it is not at a rate in keeping with the demand for more education. Therefore, automatic increases of revenues from this base are unlikely and as a result, tax rates will be raised or the school boards will have to resort to more provincial aid. In those areas where property tax revenues are dependent on an agricultural real property base the problem will be greater.

Differences in the levels of economic prosperity among the provinces must limit statements about the future reliance on the present sources used for the financial support of public education. The composition of the property tax base, the income distribution within a province, the character of provincial taxes, consumer spending patterns, public preference for government services all affect the choices to be made among tax sources, tax burdens and government services. Therefore, it may be concluded

that each province has found a method to provide a level of support in response to changes in the economic growth of that province. This method of support in any province as reflected by the elasticities presented in this study suggests variations occurred over the years in both the demand for education and its financial support. These changes have not been erratic but rather evolutionary which indicates the possibility of estimating the future expenditures and revenues for public education.

CHAPTER VII

OUTLOOK FOR PUBLIC SCHOOL FINANCE

I. INTRODUCTION

Just as man's past acts condition what he will be able to do in the future, so past trends in the economic advancement of the country can help in forecasting the financing of public education. Unfortunately, forecasts of future expenditures and revenues based on the technique of extrapolation of past experience can never be wholly accurate since economic tools are not precise enough. This lack of accuracy does not invalidate the usefulness of such projections in revealing possible or probable patterns for the future financing of education. Making such projections is at best an extremely risky undertaking, particularly in school finance which is affected by numerous exogeneous variables. In fact, it is more than likely that the most carefully formulated estimates will fall wide of their mark since projections can only be considered as predictions within the narrow limits of the assumptions used. Nevertheless, the conditions which make the projections differ also make it a necessary part of sound fiscal planning. Therefore, the purpose of this chapter is to present a method, by which the income and population elasticities derived in the previous chapter, may be employed for predicting future demand for education and its financial support under differing conditions of economic growth.

II. REVENUE STABILITY

A major concern of local governments, particularly before World War II, was the capacity of the tax structure to produce and maintain an adequate revenue which would ensure a given volume and quality of public goods even under the most adverse economic conditions. This traditional concern for tax structures which would produce relatively constant or stable revenues may be attributed to the wide fluctuations in economic activity which persisted in that era. One indicator of the stability of tax revenues is the value of the elasticity coefficients. A tax yield with elasticities greater than unity will fluctuate more than proportionately to both increases and decreases in the factors of economic growth which increases the degree of instability of the revenue. On the other hand, an elasticity of less than one indicates a low responsiveness to the factors of economic growth and a consequent stability of the tax yield. On the basis of this criterion of taxation, Groves and Kahn (1952, p. 87) proposed that the most favorable means of securing stable revenues for local government would be through the use of the property tax. This conclusion was reached by the investigators when it was found that the property tax had one of the lowest elasticities of any of the taxes they examined.

The absence of severe fluctuations in economic activity since World War II coupled with new and increased

social needs has required a re-examination of the need for
stable revenues in the case of local governments. The
growing demand for public goods suggests that tax structures
of local governments should provide revenues which rise more
rapidly than increases in population and per capita
disposable income. This study, in its measurment of the
elasticities of financial support for public education,
shows that in more recent years the property tax is
sensitive to factors of economic growth and cannot be
considered a source of stable revenues.

Under expected conditions for the future, the Whites
(1954, pp. 17-25) developed limits for the income elasticity
of the tax structures of large cities. In this study it was
found that an income elasticity approaching unity would
permit the best adaptation of municipal revenue sources to
economic fluctuations without undue modification of tax
rates or the introduction of new taxes. To maintain the
necessary revenue for all government services in a period of
inflation, the Whites recommended an elasticity of 0.85 and
for a relatively stable period 0.75. However, if the
educational function is considered alone, a tax structure
with an elasticity greater than unity was recommended to
combat all the various economic conditions proposed by the
Whites. If is is desired to keep tax rate changes to a
minimum and yet provide sufficient revenues for public
education under varied economic conditions, a tax structure

with an income elasticity between 0.8 and 1.2 is suggested by McLoone (1961, p. 126). The need for an elasticity of a tax structure greater than unity for education in Canada as indicated by the elasticities in this study suggests that revenues would tend to fluctuate greatly under changing economic conditions. Therefore, in order to compare the ability of the tax structure of each province to meet educational demands, an analysis similar to that of the Whites will be presented in this chapter.

The impact of future economic developments is demonstrated through the construction of alternative models. Such models are intended to indicate as realistically as possible a range of economic fluctuations with which school systems are likely to have to cope over the following decade. The essential problem is that different degrees of economic fluctuations have a differential effect on revenue requirements and revenue sources within each province. This could result in an infinite number of alternative situations for consideration. As a consequence, this analysis is limited to providing a framework which may be relevant and useful for the more detailed treatment necessary in working out the fiscal programme of any one province or school district.

III. FLUCTUATIONS IN ECONOMIC GROWTH

Although it has been suggested previously that severe changes in economic activity have been substantially removed

since World War II it cannot be construed that an adequate level of economic stability has been reached. The term, economic stability, in contrast to revenue stability, does not suggest a constant level of economic activity but rather a regular rate of economic growth. Such a condition of economic growth does not exist, as economic activities produce some form of dynamic equilibrium, in which mild fluctuations occur over time with respect to the rate of economic growth. This section of the chapter examines the effect of such economic fluctuation on the demand for public education and its financial support.

Before proceeding with this analysis it is necessary to establish the assumptions under which the predictions are to be made. These premises are basically restricted to future economic conditions. Extreme movements in the general level of per capita disposable income either upward or downward as experienced between the two World Wars will probably not occur over the next decade. The federal government is particularly sensitive to fluctuations in economic growth and will attempt to contain any deflationary forces which might become strong enough to produce a depression comparable to that of the 1930's. On the other hand, the federal government will also be sensitive to inflationary forces and attempts will be made to prevent these forces from reaching runaway proportions. It is therefore assumed that extreme fluctuations in the economy do not need to occur. If predictions regarding the factors

of economic growth are available it is possible to give quantitative statements to the qualitative notions of the expected degree of inflation and deflation for the future. Unfortunately, adequate data covering the future of such activities on a provincial level are not readily available and hence the national pattern is construed as representing the patterns of provincial economic growth. This method has the advantage of comparing the demands for public education and its financial support for each province under identical economic conditions. In taking this approach some deviations must occur between the proposed rates of growth in per capita disposable income and population and the rates of change that have occurred in the past among the various provinces, since identical economic conditions do not exist in the ten provinces. To illustrate this observation Table XXXIV presents the average rate of growth of both per capita disposable income and population for the years 1947-66.

The figures in this table indicate wide variations between provinces if either changes in per capita disposable income or population are considered. The greatest average rates of change in terms of economic development are experienced by Newfoundland and Prince Edward Island, where disposable income per capita rose on the average about 10 per cent each year. At the other end of the country, an annual increment of 4 per cent in population suggests that Alberta and British Columbia had the highest rate of economic growth. Furthermore, each province does not match

TABLE XXXIV

AVERAGE RATE OF CHANGE IN PER CAPITA DISPOSABLE INCOME
AND POPULATION BY PROVINCE FOR THE YEARS 1947-66

| | AVERAGE RATES OF CHANGE | |
PROVINCE	Per capita disposable income %	Population %
Newfoundland	9.6	2.1
Prince Edward Island	9.6	0.8
Nova Scotia	6.5	1.1
New Brunswick	7.6	1.3
Quebec	8.1	2.8
Ontario	7.2	3.3
Manitoba	7.1	1.5
Saskatchewan	9.3	0.7
Alberta	7.3	3.9
British Columbia	7.3	4.0

Source: Calculated from data in Tables XL to LI

exactly with the rates of change selected for the models to be used since the highest annual rate of change of per captia disposable income is no more than 7 per cent in one pattern of economic growth and the average rate of population growth is assumed to be 1.7 per cent for the complete analysis. However, this does not detract from illustrating the usefulness of this type of analysis.

The alternative patterns of change in the general level of economic activity, within a range of moderate fluctuations, are illustrated by data in Table XXXV. The values in the table present, on an annual basis, the growth of per capita disposable income and population over a ten year period with respect to different patterns of change in economic activity. The figures in the table do not refer to absolute values but indicate movements relative to the first year of a ten year time period. As a consequence, a more equitable comparison of the demands for public education and revenues to meet them may be made on a provincial basis.

One of the patterns of economic growth, Model A, presented in Table XXXV is based upon an average annual population growth of 1.7 per cent and an annual increment in per capita disposable income of 7 per cent. The annual population growth rate is the projection made by the Economic Council of Canada (1967, p. 57) for 1970-80 while the annual change in per capita disposable income reflects current trends in salary agreements. An economic

TABLE XXXV

INDICES OF PER CAPITA DISPOSABLE INCOME AND POPULATION
UNDER ALTERNATIVE PATTERNS OF ECONOMIC GROWTH FOR
A TEN YEAR PERIOD

Year	Model A		Model B	
	Per capita disposable income	Population	Per capita disposable income	Population
1	100	100	100	100
2	107	102	107	102
3	114	103	114	103
4	122	105	109	105
5	131	107	104	107
6	140	109	114	109
7	150	111	124	111
8	161	113	133	113
9	172	114	142	114
10	184	116	152	116

depression is represented in Model B by means of a decrease in per capita disposable income which assumes an increase in unemployment. This decline at a rate of 5 per cent per year occurs in years 4 and 5. In the subsequent years 6 and 7, a growth rate in per capita disposable income of 9 per cent permits a rapid recovery to a level at which it existed before the depression. During the remaining years of the ten year model the annual growth rate returns to 7 per cent. No change in the growth of the population is anticitpated therefore the value of 1.7 per cent for the annual growth rate introduced in Model A is also used in Model B.

Since no differences in the population growth rate exist between the two models the resultant accumalative effect on population size at the end of the ten year period is the same for the two models. Both models effect a final population 16 per cent greater than in the initial year. The consequence of the recession is noticeable with respect to the growth of per capita disposable income over the decade. Model A which illustrates a mild inflationary effect concludes in the final year with a value of the per capita disposable income, 84 per cent greater than in the initial year. The recession period in Model B, despite an accelerated growth period, dampened the growth of this variable over the decade to the extent that in the final year, per capita disposable income differs by 32 per cent between the two models.

IV. FUTURE EXPENDITURES

Projections of revenue requirements are not available on a province-by-province basis but the elasticities of demand for education derived in Chapter IV may be used for this purpose in conjunction with the rates of growth of the independent variables given in the models. This approach eliminates any possible effects of changes in provincial education policies, such as extending the years of attendance, on revenue requirements. Thus, the models in essence, represent the maintenance of the present standards of public education and thereby the projections represent the minimum needs for the future.

The technique by which patterns of expenditures for each of the provinces is derived involves the use of the elasticity of demand for public education in each province for the years 1947-66. This time span was selected in order to reduce the effect of cyclical fluctuations in these coefficients to a permissable minimum. To arrive at the annual rate of growth of revenue requirements it is necessary to sum the products of the elasticitiy and annual growth rate of the appropriate independent variable. This calculation is readily represented as follows:

$$R_r = Ep \cdot P + E_I \cdot I$$

where R_r is the annual growth rate of revenue requirements, E_p is the appropriate population elasticity, P is the population growth rate, E_I is the per capita disposable

income elasticity, and I is the annual growth rate of the
variable. This rate is then applied successively beginning
with an index of 100 until the ten years is completed.

Table XXXVI presents the expenditure patterns for
education in each province for implementing a budget rise
over a ten year period which takes account of a simple
inflationary effect exhibited in Model A. The expenditure
indices are based upon the initial year of the series and
therefore reflect patterns of change, not amounts of dollar
expenditures. As a consequence, they can be considered
applicable to any absolute level of dollar expenditures in
the initial year. While the per capita disposable income
and population rise from 100 to 184 and 116 respectively the
revenue requirements index varies widely from province to
province. Over the ten year span, depending on the province,
the expenditure index at the very least doubles and at the
other extreme, quintuples under the conditions of economic
growth outlined previously in Model A.

The educational expenditure patterns which are
derived from the use of the rates of growth of population
and per capita disposable income in Model B are presented
in Table XXXVII. Under the impact of both inflationary and
deflationary forces depicted in this model, the revenue
requirements would not ultimately increase to the same index
values as in the other model. Those provinces with revenue
requirements more responsive to changes in per capita
disposable income than population will experience the effect

of deflationary forces to a greater degree because of the
higher growth rate of this variable. However, the revenue
requirements are not affected to any substantial degree by
a minor recession. The expenditure indexes for the final
year indicate that expenditures still increased by two to
five times over the ten year period.

An additional interesting result is provided with the
use of Model B. The revenue requirements in all provinces
but Prince Edward Island and British Columbia, continued to
rise during the contraction phase of the cycle as well as
the expansion phase.

If these patterns are regarded as being representative
of the prospective financial needs for public education in
each of the provinces or on a nationwide scale, it is
apparent that the stability of the yield of revenue sources
is a dubious criterion for evaluating these sources. It is
also apparent that no one specific degree of sensitivity of
a tax structure with respect to economic fluctuations can be
ideal. Thus, a situation cannot exist where revenue sources
can provide a pattern of yield changes which exactly match
the revenue requirements over an extended period of time.

V. REVENUE SOURCES

A convenient means of calculating the yield index of
the revenue sources for public education is by the use of
elasticities derived in Chapter V in a manner similar to the
one explained above. Since the tax structure includes two

revenue sources, then the problem of weighting must be considered since the elasticities for the sources differ. The elasticity coefficients of a tax structure for a given year are the weighted averages of the appropriate coefficients of each tax, the weights being based upon the share of the revenue yield provided by each tax for that year. As this part of the study is basically designed to illustrate a framework which may be used for working out the fiscal programme of a province only one combination of property tax revenues and provincial education grants is used. However, in order to keep the models as close to reality as possible a 50:50 weighting of the revenue sources is used, which was the approximate nationwide weighting in 1966 (Brown, 1969, p. 61).

Comparisons of financial requirements and available revenues of each province under the conditions of Model A may be made by examining the figures in Table XXXV. The various patterns of available revenues originate at the same base index as the revenue requirements on the assumption that in the initial year tax rates are set to provide sufficient revenues to cover current expenditures. The ideal revenue structure for a specific province would be one which automatically provides a flow of revenue, without rate change, just sufficient to meet the requirements in each of the ten years, regardless of underlying economic conditions. Unfortunately, this ideal situation does not exist for all provinces.

TABLE XXXVI

INDICES OF EDUCATION EXPENDITURES AND REVENUES UNDER THE CONDITIONS
OF MODEL A, BY PROVINCE FOR A TEN YEAR PERIOD

PROVINCE

Year	Newfoundland		Prince Edward Island		Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan		Alberta		British Columbia		Canada	
	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue	Expenditure	Revenue
1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2	112	112	117	116	116	117	109	113	112	117	110	114	113	116	120	117	108	108	116	115	111	113
3	125	125	136	136	135	136	118	128	126	137	121	131	128	135	143	137	116	118	135	132	123	129
4	140	141	160	158	156	159	129	145	141	160	134	151	145	158	171	160	126	128	156	152	136	147
5	156	157	187	184	182	185	140	164	158	187	148	173	164	184	204	188	136	140	182	175	151	168
6	175	176	218	214	211	216	153	186	177	219	163	198	185	214	244	220	147	152	211	202	168	192
7	195	197	255	249	245	252	166	211	199	256	179	227	209	249	292	258	158	165	245	232	186	219
8	218	221	298	291	285	294	181	239	224	300	198	261	237	290	349	302	171	179	284	267	206	251
9	244	248	349	339	331	343	197	271	251	351	218	299	268	338	418	353	185	195	330	308	229	288
10	273	278	408	395	384	400	215	307	281	410	240	344	303	394	500	414	199	212	383	354	254	330

[1] All revenues derived from provincial grants.

Source: Calculated from data in Tables IX, XVII, XXXII, XXXIV

Although revenue requirements and tax yields virtually coincide for each of the ten years in Newfoundland, none of the other provinces meet this conditions. Of the remaining provinces, Saskatchewan and British Columbia would be unable to meet the revenue requirements for public education under the conditions set for this analysis. The remaining provinces show an increasing surplus of funds available for public education in a mild inflationary economic situation. The abundance of funds in this example, particularly in the final years, must not be construed as the condition that will exist in these specific provinces. In this demonstration, the rate of growth of population and per capita disposable income is assumed to be the same for all provinces. However, actual conditions of the factors of economic growth which vary from region to region are unavailable and thereby prevent actual predictions of revenue requirements and tax yields.

When the effects of economic fluctuations of the type represented in Model B are considered it becomes evident that no ideal automatic flow of revenues to meet the requirements is possible. The comparison of revenue requirements and the tax structure yields under these conditions may be made by examining the data in Table XXXVII.

The annual revenue in the trough year (year 5) fails to cover the expenditures in a majority of the provinces a problem which developed in some cases during the first year of depression. However, with the exceptions of Nova Scotia,

TABLE XXXVII

INDICES OF EDUCATION EXPENDITURES AND REVENUES UNDER THE CONDITIONS
OF MODEL B, BY PROVINCE FOR A TEN YEAR PERIOD

PROVINCE

Year	Newfoundland Expenditure	Newfoundland Revenue	Prince Edward Island Expenditure	Prince Edward Island Revenue	Nova Scotia Expenditure	Nova Scotia Revenue	New Brunswick Expenditure	New Brunswick Revenue	Quebec Expenditure	Quebec Revenue	Ontario Expenditure	Ontario Revenue	Manitoba Expenditure	Manitoba Revenue	Saskatchewan Expenditure	Saskatchewan Revenue	Alberta Expenditure	Alberta Revenue	British Columbia Expenditure	British Columbia Revenue	Canada Expenditure	Canada Revenue
1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2	112	112	117	116	116	117	109	113	112	117	110	114	113	116	120	117	108	108	116	115	111	113
3	125	125	137	136	135	136	118	128	126	137	121	131	128	135	143	137	117	118	135	132	123	129
4	127	129	129	129	142	129	126	130	133	133	126	124	138	137	166	146	122	123	125	124	128	126
5	129	134	121	122	149	123	133	133	141	130	131	117	148	139	194	155	128	129	116	117	134	123
6	148	153	146	147	175	148	151	153	159	156	145	139	169	165	233	184	139	141	140	139	150	147
7	170	173	177	178	207	177	170	176	180	188	162	166	192	198	279	220	151	154	168	165	168	177
8	190	194	206	207	240	207	185	199	202	220	178	191	218	230	334	257	163	168	196	190	186	206
9	212	217	241	241	279	242	202	226	227	257	197	219	246	268	399	301	176	182	228	219	207	240
10	237	243	281	281	324	282	219	256	255	301	217	251	278	313	478	353	190	198	266	252	229	279

1 All revenues derived from provincial grants.

Source: Calculated from data in Tables IX, XVII, XXXII, XXXV

Saskatchewan and British Columbia, the other provinces

recovered to the point that surplus revenues were available

once the inflationary period was re-established. One

interesting consequence, is that the depression effect

resulted in almost identical revenue requirements and tax

yields for Prince Edward Island, which under a regular

inflationary period required additional funds for public

education.

The development of the tax structure yields for the

two models has been made without concern for changes in the

tax rates. If the tax rates of the property tax are to

remain unchanged then the growth rate of the tax base,

assessed real property, must be identical to that of the

property tax revenue. Table XXXVIII compares these growth

rates under the economic conditions of Model A for those

provinces for which elasticities of the assessed value of

real property are available for the period 1947-66. In the

majority of the selected provinces, the growth rate of

assessed value of real property is less than that of the

revenue from the property tax. Particular attention is

drawn to British Columbia where the annual growth rate is

six times that of the assessed property value annual growth

rate. Under such conditions, it is inevitable that the

rates of the property tax must increase in order to meet the

obligations required of it in the given tax structure for

public education.

Even if the growth rates of the property tax base and

TABLE XXXVIII

ANNUAL PERCENTAGE GROWTH RATE OF ASSESSED PROPERTY
VALUE AND PROPERTY TAX REVENUES UNDER MODEL A
CONDITIONS BY SELECTED PROVINCES

PROVINCE	Assessed property value annual growth rate %	Property tax revenue annual growth rate %
Nova Scotia	17.53	14.42
New Brunswick	12.46	15.53
Ontario	7.24	18.28
Manitoba	9.18	9.72
Saskatchewan	5.99	5.24
Alberta	6.06	14.34
British Columbia	4.08	24.48

Sources: Calculated from data in Tables XVI, XXI, and XXXV

its revenues are equal despite any economic fluctuations,
the above analysis indicates that tax rates have to be
changed for many provinces in the recession period to a rate
above the pre-recession levels. The increase is necessary
to reduce the gap between revenues and expenditures in a
recession. The size of the increase is dependent on the
value of the per capita disposable income elasticity of both
revenue requirements and tax sources. If it is important to
minimize a property tax rate during recession, a low
elasticity structure for the property tax revenues may be
preferable.

VI. IMPLICATIONS FOR EDUCATIONAL FINANCE

The application of the two patterns of economic
fluctuations to the financing of public education point out
several implications. The most obvious observation is that
revenue requirements and revenue sources for each province,
as expressed in terms of elasticities, cannot meet a unique
set of requirements for the factors of economic growth.
This finding is not surprising since the demands for public
education and its financing are subject to some degree to
the regional economic conditions which vary quite widely
from province to province. A more interesting observation
is in regard to the growing levels of expenditures under
such moderate increases in the factors of economic growth.
Under the given conditions, the educational expenditures for
a major number of provinces would at least triple in a ten

year period. Since the increases in the factors of economic growth of a number of provinces are shown to be greater than the projected national average used in this chapter, it is to be expected in some cases that educational expenditures would more than triple in a decade. Whether the public in the future will demand education to the degree that the above analysis shows is subject to question.

In recent years the role of property taxes in financing public education has been changing. Variations among the provinces and school districts in reliance on this tax impose limitations on the usefulness of the trends developed in this analysis. Since the elasticities of property tax revenues are greater than unity, then the tax yield will be sensitive to economic fluctuations. The result will be that in recession periods the tax rate will have to be increased to provide the required revenues.

The projected elasticities of property tax revenues and assessed values of real property indicate that future increases in property tax revenues will require increases in tax rates. Such increases in tax rates would be greatest in those provinces with a restricted capital investment in structures like residences and industrial plants which are most responsible for absolute increases in the aggregate value of real property. Thus, one would expect the greatest increase in tax rates to be in those provinces with a predominantly agricultural real property tax base.

Property tax rates will also increase if the

proportion of educational revenues provided by the property tax remains unchanged and the elasticities of the property tax revenues are less than those of the provincial grant. Increases due to this effect may be compensated by adjusting the proportion of educational revenues financed through the property tax. However, the consequence of such action would be to place an increasing amount of the financial support for public education in the domain of the provincial governments. Whatever action is taken, the provincial governments will need to consider the elasticities of the revenue sources in addition to those of the general tax structure for school support if they wish to maintain or change their share of the total educational revenues.

VII. FUTURE FINANCIAL SUPPORT OF EDUCATION

Under present day conditions the concern for a stable revenue source is purely academic. Neither the provincial governments nor the school boards have a choice between an elastic and inelastic tax structure. The only alternative is to change the degree of elasticity by adjustments in the property tax rates or in the proportion of total revenues derived from the provinces. The more elastic tax structure will readily provide funds in periods of economic growth but in periods of economic decline a demand will be created for higher tax rates. Under such varied conditions it is impossible to even suggest an ideal elasticity for the tax structure of one province, let alone all provinces.

Therefore, the points to be made in this section are of a general nature which may be adapted to suit provincial or local needs.

To varying degrees, all provinces possess an education revenue structure in which the major portion of the funds are derived from property tax revenues and/or provincial grants. The stability of this arrangement may be defined in terms of constant provincial and local shares of the revenue provided or a constant tax rate for the property tax. These objectives of stable shares in the revenue and constant tax rates are mutually exclusive unless all the sources of revenue in the tax structure have identical elasticities.

If the objective is to maintain stable provincial and local shares of a revenue structure in a mild inflationary period of economic growth then a commitment to increased property taxes is implied if the elasticities of the property tax revenues are less than those of the provincial grants. The tax rate of the local contribution, under these conditions, would have to increase regularly to provide a constant proportion of the required revenues. If the elasticities of the local source of revenues are greater than that of the provinces a reduction in property tax rates or increased provincial grants may be anticipated when the ratio of revenues is kept the same. In direct contrast, the tax structure which uses a fixed tax rate for local contribution will mean a decrease in the proportion of

total revenues derived from local tax sources if the elasticities of this source are less than those of the provincial grants. Obviously if the elasticities of the property tax revenues are greater then a greater proportion of revenues will be derived from this source.

In a period of decline in economic growth, an opposite effect would hold true. The maintenace of constant shares of total revenues or a constant tax rate cannot be achieved without affecting other objectives. If the tax rate is made constant then the elasticities of the revenue structure will have to be changed in order to prevent a shift in the composition of the tax structure. Thus, the flexibility of the revenue structure is always possible provided that revenue is available from more than one source. It would appear that the rigidity of the revenue structure for public education is certain only when one revenue source, which is used exclusively for education, is available.

A further factor which introduces a high degree of rigidity into educational financing is the requirement of an annual balanced budget. If a departure from this principle were permitted it might become possible to offset deficits of one year with the surpluses of another. This approach would offset to some degree the need for adjusting tax rates especially in a period of recession. While elasticities remain relatively high this method might be more feasible than an annual alteration of the provincial government's

share in providing revenues for public education. In essence, the proposed method of financing would be a combination of revenue sources with high disposable income elasticities and a program of "carry-overs" of annual surpluses and deficits. In this way alternate periods of mild inflationary and deflationary forces might be met without alteration to tax rates or shares in the total revenue.

White and White (1954, p. 29) have suggested such a program which would cope with economic fluctuations for municipal governments which could be adapted for school systems. Rather than restrict the budgetary process to one calendar year it might be extended over several years. In the initial year of such a period, forecasts would be made of alternative patterns of economic growth for the region or province. Using elasticities for the projections of revenue requirements and revenue potential the fiscal condition could be established for the planning period. Subsequently a tax structure could be developed in which tax rates and the share of revenues between the sources are determined in a manner that would adequately meet the requirements of any one of the patterns of economic advancement forecasted. Any surpluses would be placed in a reserve fund to be used for the purpose of offsetting deficits in other years. An increase in tax rates would occur only because of significant policy changes or gross errors in the projections. Any tax rate changes to account for minor surpluses or deficiencies

could be made at the beginning of the next planning period.

This program of balancing revenues and expenditures over a multi-year period, though offering an adaptation to economic fluctuations does suffer from one serious short-coming. Its implementation is completely dependent on extensive long range planning and forecasting which is subject to a number of problems outlined in the initial part of this chapter. A less ambitious plan would be concerned with the provision of a reserve fund.

Such a fund would be aimed at minimizing the need for tax rate increases during or subsequent to a recession. From the previous analysis, it would appear that educational activity does not rise and fall with changing economic conditions to the same degree as the revenues, but are more determined by the number of children to be educated. A fund of this nature would be less dependent on long term predictions and yet should be functional with a high elasticity tax structure. The idea of accumulating surpluses during an inflationary period in advance of a recession need not imply that the funds be collected in advance of their need. An alternative would be to extend the concept of borrowing for capital items to include current expenditures. In this way, recession deficits could be paid off by loans which would be retired out of surplus revenues in subsequent periods of economic growth. The major disadvantage of this approach is that borrowing for purposes of meeting obligations with respect to current expenditures is

considered to be unacceptable for local governments.

To this point the suggestions made are directed towards maintaining the status quo with respect to the political responsibility for public education. A common concern of school boards is a decrease of this power as a greater degree of the financial obligations is taken over by the provincial governments. If neither of the above suggestions or modifications is implemented then the centralization of control over education will be accelerated. This might be the inevitable solution with regard to overcoming the effect of economic fluctuations on the provision of revenues for public education. All of the above suggestions except the last would result in substantial increases in the property tax rate which has already been criticized for being too high. Since the property tax is not progressive, any tax rate increase would result in an additional burden on the low income group without a corresponding increase in benefits. If the policy of taxation in this country is fundamentally based on the ability to pay then the provincial governments, whose tax systems are relatively progressive and varied, should accept more fiscal responsibility for public education. Such multi-purpose governments provide many and varied services which gives them a greater degree of flexibility in the provision of revenues for a particular service than a government with a single concern can offer. Whether the political implications of such an economic solution are

acceptable to the public is another question which is beyond the scope of this study.

Summary

The major points of this chapter may be summarized as follows:

1. The types of economic fluctuations with which school boards and provincial governments must cope over the next decade are continuous inflation with periods of mild recession.

2. To appraise the impact of prospective fluctuations on school financing, an analysis of their effects on revenue demands and sources must be made.

3. The "best" adaptation of educational revenues to economic fluctuations is one that minimizes the need for changes in the revenue structure such as tax rate change or the introduction of new taxes.

4. During inflationary periods high elasticity revenue sources are preferable to the more stable, low elasticity sources.

5. If the effect of inflationary-recession cycles on revenues not meeting expenditures is to be overcome without unnecessary changes in tax rate or base it is necessary to adopt one of the

following suggestions:

a. Adopt a multi-year budget complete with a
   program of surplus carry-over.

b. Provide an automatic reserve fund from which
   funds may be withdrawn in a recessionary
   period and replenished during times of
   economic expansion.

c. Place the total fiscal responsibility for
   public education in the hands of the
   provincial governments.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

I. INTRODUCTION

This study has been concerned with an analysis of the responsiveness in each province of the demand for public education and its financial support to changes in factors of economic growth for the time period 1930 to 1966. As a consequence, it has involved (1) an analysis of the effect of changes in factors of economic growth on the per capita expenditures for public education, assessed real property values, and the principal sources of revenues, property tax revenues, and provincial grants; (2) an analysis of the effect of changes in provincial revenue sources on the provincial education grants; and (3) the formulation of an analytical approach to examine the effect of differing economic conditions on future demands and financial support for public education. The present chapter will summarize the major findings and suggest areas for additional research.

The investigation of the effects of changes in economic growth on the fiscal support of public education required the selection of suitable variables which would be representative of these factors of economic progress. In the past, numerous variables have been used to indicate economic growth. For purposes of this study, the variables,

population and per capita disposable income were selected to represent the factors of economic growth. Many fiscal sources provide funds for the general revenues of a province. Only those that could be categorized as federal grants, sales taxes, revenues from natural resources, and direct taxes were considered in the analysis of the effect of provincial revenue sources on the educational grants.

The basis for the empirical analysis of this study was the economic concept of elasticity which describes the association between inter-dependent variables. The elasticity coefficient produced indicates the relative change of one variable with the corresponding change of an associated variable. With time-series data, the elasticity coefficients were derived by a method which summarized the changes in the variables concerned for a period of years and presented an average value of the coefficient. The approach used, involved a modification of stepwise multiple regression analysis by which the elasticity could be derived as follows:

$$e = \frac{\log x + \log A}{\log y}$$

where x is the dependent variable, y is the independent variable, and A represents the regression constant. Various time periods were selected based on general economic conditions.

The major thrust of this study was the investigation of elasticities of revenue sources and demands for public

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education. An additional part of the study included the application of the elasticities for 1947-66 to an analysis of the effect of certain economic fluctuations on the revenue requirements and resources for public education in each province. The implications from this part of the study provided suggestions for the future financing of public education.

This study was therefore, essentially an heuristic study of the relationship of changes in the factors of economic growth and the demand for public education as well as its financial support. From the results of these findings implications for the financing of public education in the next decade were examined. An important by-product of the study has been the historical compilation of data for the variables used in this study.

II. MAJOR FINDINGS

The major findings of the study are summarized under the following headings: (1) Demand for Public Education, (2) Revenue Sources for Public Education, and (3) Implications for the Future.

Demand for Public Education

The major finding relevant to this part of the study is the lack of a particularly predominant set of population and income elasticities common to all provinces. However, on the basis of inter-provincial comparisons less divergence

between the values of these elasticities is observed in the time periods closest to the present day than in earlier periods. This indicates that, despite regional differences in many socio-economic factors, the demand for education based on elasticity measures may reach a relatively common level for all provinces. However, a uniform demand for education among the provinces in no way suggests that similar per capita education expenditures are being made in each province since elasticities do not indicate the aggregate expenditures for education in a province.

Over the time period examined, those elasticities derived for more recent time spans account for a greater per cent of the variance of per capita expenditures than in earlier sub-periods. In the 1957-66 sub-period, the independent variables accounted for more than 95 per cent variance of per capita expenditures in eight provinces. These findings indicate that population and income elasticities are adequate predictors for purposes of estimating future educational expenditures.

No matter which time period is considered, the elasticities approach or are greater than unity which indicates that per capita expenditures are quite sensitive to changes in both population and per capita disposable income. However, throughout the study the population elasticity coefficient tends to be somewhat greater than the income elasticity coefficient. It is therefore evident that increments in per capita disposable income do not effect as

profound a change in the demand for improved education as has been indicated in previous studies. Thus, changes in the population level of a province will affect the per capita quantity of resources required for public education to a greater degree than equivalent changes in per capita disposable income.

The greater sensitivity of educational expenditures to changes in population is partly accounted for by the growing social stress for improving an individual's level of education. As a consequence, intense efforts have been made to retain students in school until they have attained a matriculation standard. Such emphasis on education has led to the academic requirements of many jobs being raised without a concomitant change in the intellectual demands of the position. As the population increases it is therefore not surprising that the demand for education is significantly affected by population growth. However, as a greater percentage of the population successfully complete the academic requirements for public education then the importance of this factor on the demand for public education will diminish.

The income elasticities derived in this study are somewhat lower than those indicated in some previous Canadian studies. This leads one to conclude that the elasticities quoted in earlier studies account for the combined effects of changes in population and per capita

income on educational expenditures. Despite the lower income elasticities, the effect of a moderate rate of economic growth on the demand for public education as calculated with the aid of elasticities derived in this study is substantial. Given an annual rate of growth of 1.7 per cent for population and 7.0 per cent for per capita disposable income, one could expect provincial per capita expenditures to at least double and in one case quintriple within ten years on the basis of elasticities for public education calculated from 1947-66 data.

Revenue Sources for Public Education

Several areas of concern were expressed with respect to the revenue sources in the initial statement of problems to be examined. In particular, growing attention has been directed towards the apparent inability of the property tax to provide sufficient financial support for the rising expenditures in public education. Connected with this problem is the concern that grants, either provincial or federal, have an undesireable effect on the provision of education revenues by the respective lower government.

The decreasing contribution of property tax revenues to the total financial support of education suggests that this revenue source is not keeping pace with the increased demand for education despite the fact that revenues from this source continue to increase. The elasticities of the property tax revenues indicate that this decline will

continue in the future. Both the income and population elasticities of this revenue source indicate that property tax revenues will adjust proportionately to the changes in these factors of economic growth. However, these elasticities tend to be less than those of the other principal source of educational revenues, provincial grants, which can lead to consequences that only become apparent over a number of years.

When a revenue structure consists of two or more revenue sources, the percentage yield of one of the sources is partly determined by the relative position of its elasticity coefficients with respect to those of the other revenue sources. If the relative positions of the elasticity coefficients as well as the tax rates of these revenue sources remain unchanged over a number of years, then the proportion of the total yield provided by the source having the lowest elasticities will diminish. Since the elasticity coefficients of the property tax revenues are lower than those of provincial grants one can expect a continued reduction in the level of contribution by this source to the fiscal support of education. For the property tax to maintain a constant proportion of the total revenue yield it would be necessary to increase the present tax rates or the value of the tax base. In the past, both of these variables have increased but not sufficiently to maintain a constant proportion of total educational revenues. Elasticities indicate that the property tax base

is not as sensitive to changes in factors of economic growth
as are the property tax revenues. This is particularly
evident with the agricultural real property tax base. As a
consequence, the increase in property tax revenues has not
been completely due to a natural increment in the value of
the tax base but includes a contribution as a result of
increased tax rates. The importance of the contribution due
to increased tax rates is indicated by the fact that the
annual effective tax rate on a nationwide scale increased by
approximately 100 per cent between 1950 and 1966.

The general conclusion to be derived from these
findings is that property revenues lack the necessary degree
of elasticity to meet the growing demand for education.
This inability of the property tax to provide the necessary
funds for rising expenditures in education might be
initially ascribed to the fact that the growth rate of the
tax base has been less than adequate. The consequences of
this condition has been a vain attempt to maintain the yield
of the property tax with higher tax rates since this tax
lacks any degree of progressivity as found with the income
tax. It would therefore appear that the present level
of property tax rates is such that the public is beginning
to express its discontent through political channels. Thus,
in the post-war years, the initial inability of the property
tax to provide necessary revenues for public education
because of a low growth rate of the tax base, has led to
increased tax rates. This has resulted in a growing concern

on the part of the tax payers with the provision of more funds through this form of taxation. Since this concern is being expressed more frequently it would appear that revenues generated by the property tax are reaching a "political" ceiling rather than an actual tax burden. Therefore, other tax sources which are more progressive in nature will have to be used to fund public education.

In the earlier years considered in this study it would seem that the representative variables for economic growth were not useful predictors of provincial grants or property tax yields. However, in periods closer to the present day, both population and per capita disposable income in most provinces account for more than 90 per cent of the variance of the revenue sources. Once again, no specific trend could be discerned for any one province.

The growing involvement of provincial governments in public education finance has in no way lightened the property tax burden. Throughout the whole period under study, it would appear from the elasticity coefficients, that property tax revenues changed in association with provincial contributions to public education. It would therefore appear that provincial education grants promote, rather than substitute for additional use of the property tax as a revenue source.

Previous studies have implied that federal grants or non-tax revenues may have an influence on the degree to which a province provides funds for public education. The

analysis of the responsiveness of provincial grants to changes in provincial revenue sources shows that in most provinces the changes in provincial grants are less than proportionate to federal grant changes. Thus, the extent to which changes in provincial education grants respond to funds given to provincial governments by the federal government is not significantly greater for the poorer provinces than the richer provinces. This situation would suggest that federal grants are not helping the poorer provinces to raise their educational stock to a level approaching that of the richer provinces.

Those provinces rich in natural resources which provide a ready source of non-taxable revenues might be expected to direct some of those revenues towards human investment through education. The natural resource elasticities suggest that such is not the case. In fact, Alberta, which relies heavily on natural resources for provincial revenues, indicates that increases in their revenue are associated with a slight decrease in provincial grants for education. Of any of the provincial revenue sources examined one would conclude that provincial education grants in general are most sensitive to changes in the the sales and direct taxes.

The effect of mild trends in inflation and recession, on the sources of revenues, indicates that under certain conditions the present revenue structure in most provinces is incapable of meeting the revenue requirements over an

extended period of time without substantial changes in tax
rates. Suggestions for overcoming this possible deficiency
include: (1) extending the budgetary period over a period of
years to permit a carry-over of surpluses and deficits, (2)
setting up some form of reserve fund which is replenished in
times of expansion and used in times of economic contraction,
and (3) arranging for the provincial government to accept
full fiscal responsibility for public education. A less
complicated approach in the long run might be a reduction
in the demand for public education. Although some of the
increases in per capita expenditures may be accounted for by
inflationary forces it may be difficult for many of the
public to accept a continuous tripling of educational
expenditures every decade. Signs of reluctance on the part
of the public and government are quite visible at present.
Just what the effect will be on educational expenditures is
difficult to estimate for the time being as it is a
relatively new phenomena for the post-World War II era.

Implications for the Future

The revenue for public education is ultimately
derived from each individual who earns an income which is
taxed or spends money on goods which bear a tax. A basic
concern of education finance, as well as the financing of
any public service or good, is therefore to select a tax
structure which will provide just enough revenues under mild
economic fluctuations to cover all current expenditures,

without excessive complaints from the taxpayer. The
difficulty of completing such a task is readily observable
in this study. Achievement of this aim is restricted
because uncontrolled changes in the factors of economic
growth as well as deliberate changes in the tax rate or base
will affect the revenue from a tax. Therefore, to be
successful in this venture, the revenue structure should
provide funds for the most pessimistic projections under
deflationary conditions. Such conditions would require an
extremely low elastic revenue structure or a constant
changing of tax rates. However, limitations exist in
either proposal.

The selection of a revenue structure will depend not
only on the education demands indicated by projections but
also on desired objectives for the revenue structure itself.
These objectives may be of both an economic and a political
nature such as establishing and maintaining a constant
proportion of total revenues provided by one source. Each
total revenue structure presents a range of elasticities
which permit only a limited leeway in meeting both groups of
objectives. Depending on the objectives and the demand for
education, each alternative structure has certain advantages
and disadvantages and consequently no unique revenue
structure exists. The various objectives that might be
proposed for revenue sources, the desire of the public for
the type of taxation, the wealth of the region, the
financing of other services, all contribute to determine the

"best" solution for a given province. Therefore, it should not be surprising that differences in the financing of education from province to province will continue to exist.

If the future needs for education cannot be accomodated by the present revenue structure in a manner acceptable to the public then changes will have to be made. In the past, additional needs for public education were met by changes in tax rates and bases or in the proportion of revenues provided by each source. Exactly the same methods will have to be employed in the future and therefore the complaints and criticisms of the tax structure for education given in this study will be constantly repeated. However, such criticisms can be softened or counteracted if predictions of future conditions can be made and used. This study presents one such process in which the effects of fluctuations in certain factors of economic growth on both revenue requirements and sources may be examined and future action planned.

The elasticities of the revenue sources and educational expenditures cannot be ignored in such long range planning. An understanding of the implications and meaning of elasticities is needed if public education is to be financed equitably and adequately. Each revenue source has a different response to changes in the factors of economic growth which is subject not only to the source itself but also to the particular province and time period being considered. These facts will need further attention

since more difficulties in financing public education can be expected in the future.

III. SUGGESTIONS FOR FURTHER RESEARCH

The analysis used in this study has treated each province as a singular community in which intra-provincial variations have been ignored. Since this macroscopic approach has shown the lack of a "best" set of elasticities that may be used in considering the future financing of education; it would be extremely useful to apply similar analyses to the revenue requirements and sources of regions within a province.

Ideally, an analysis of each of the ten provinces at the school district level would be extremely useful especially with respect to the administration of provincial Foundation Programmes. In addition, a replication of this study with more current data would be an area for further research. This suggestion is prompted by what appears to be changing attitudes with respect to the demand for public education at the present time.

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APPENDIX

APPENDIX A
ANNUAL DATA FOR EACH OF THE PROVINCES
AND CANADA
1930-1966

TABLE XXXIX

ANNUAL DATA FOR THE PROVINCE OF NEWFOUNDLAND: 1949-66

(x 1000)

Year	Population 1	Personal disposable income 1 $	Educational expenditures 2 $	Provincial grants 2 $	Property tax revenues 2 $	Assessed real property value 3 $	Federal grants 4 $	Natural resource revenues 4 $	Sales tax revenues 4 $	Direct tax revenues 4 $
1949	345	157000	4299	3200	0	0	0	0	0	0
1950	351	171000	4509	3430	0	0	12601	443	4629	6631
1951	361	197000	4648	3557	0	0	13220	543	7352	7754
1952	374	207000	5490	4141	0	0	10577	763	9912	11574
1953	383	227000	6431	4839	0	0	9590	576	12004	12066
1954	395	245000	6781	6239	0	0	10442	362	13536	12366
1955	406	260000	8555	6960	0	0	10439	391	15021	12500
1956	415	289000	9819	7716	0	0	9876	718	17141	13475
1957	426	311000	11347	8935	30	0	9440	1326	19067	15472
1958	438	330000	13378	11533	163	0	31321	1568	19035	16676
1959	449	357000	14904	12861	205	0	37654	948	20956	19236
1960	458	375000	17164	14879	212	0	36914	1376	23646	20349
1961	468	406000	18091	15735	205	0	36963	1441	27809	20173
1962	476	424000	19126	16621	272	0	48448	1464	30995	21337
1963	483	458000	21371	18746	363	0	55403	1600	34154	22498
1964	488	492000	23916	20790	455	0	65206	1349	40124	27534
1965	493	547000	26100	22674	617	0	70608	2774	46295	36662
1966	493	613000	29050	25142	703	0	70893	3545	51754	44691

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1962, 1967.

2) Dominion Bureau of Statistics, Survey of Education Finance, 1947-1965.

3) Dominion Bureau of Statistics, Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt Actual 1947-1966.

4) Dominion Bureau of Statistics, Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-1967.

TABLE XL

ANNUAL DATA FOR THE PROVINCE OF PRINCE EDWARD ISLAND: 1930-66

(x 1000)

Year	Population 1	Personal disposable income 1 $	Educational expenditures 2 $	Provincial grants 2 $	Property tax revenues 2 $	Assessed real property value 3 $	Federal grants 4 $	Natural resource revenues 4 $	Sales tax revenues 4 $	Direct tax revenues 4 $
1930	88	21000	438	249	190	31843	528	0	354	252
1931	88	16000	448	254	189	32596	690	0	358	221
1932	89	13000	481	263	218	33680	557	0	373	256
1933	90	12000	447	264	183	33732	574	0	371	270
1934	91	13000	430	262	160	33948	852	0	390	306
1935	92	15000	488	265	224	34065	1062	0	395	275
1936	93	17000	464	224	265	34132	1131	0	467	358
1937	93	19000	450	269	181	34305	1000	0	543	366
1938	94	18000	442	271	171	34666	1040	0	647	389
1939	94	19000	430	274	175	0	1015	0	622	425
1940	95	21000	437	269	176	10389	927	0	625	388
1941	95	22000	442	266	176	10422	845	0	609	827
1942	90	26000	457	274	183	10461	654	2	692	889
1943	91	32000	492	291	202	10596	888	2	855	1056
1944	91	34000	522	305	218	10468	795	2	896	961
1945	92	40000	569	318	251	10623	731	2	1136	929
1946	94	42000	642	349	293	11030	773	2	1738	1196
1947	94	42000	725	364	316	11426	1132	3	2194	1661
1948	93	45000	984	547	369	12273	1435	5	2286	1845

TABLE XL (continued)

Year	Population [1]	Personal disposable income [1] $	Educational expenditures [2] $	Provincial grants [2] $	Property tax revenues [2] $	Assessed real property value [3] $	Federal grants [4] $	Natural resource revenues [4] $	Sales tax revenues [4] $	Direct tax revenues [4] $
1949	94	50000	1032	544	438	13715	1722	6	2339	1970
1950	96	51000	1180	595	489	16872	1897	9	2558	2169
1951	98	58000	1282	663	539	23539	2110	10	2733	2455
1952	100	68000	1320	630	601	25792	1696	12	3094	3100
1953	101	64000	1519	794	683	25340	1308	12	3222	3545
1954	101	67000	1570	928	703	26361	1554	13	3324	3342
1955	100	67000	1819	994	814	27926	1769	14	3435	3739
1956	99	72000	1914	1074	856	29147	2466	16	3535	3225
1957	99	73000	2203	1174	1000	29590	2219	16	4143	3870
1958	100	82000	2453	1220	1178	34482	4390	21	4631	4242
1959	102	90000	2876	1565	1273	34748	5530	21	5570	4362
1960	103	98000	3476	2154	1323	36778	7694	18	7118	4696
1961	105	96000	3907	2478	1412	0	7797	16	8742	4796
1962	107	106000	4612	2937	1566	0	9001	17	9276	5101
1963	108	112000	5643	3502	2149	0	11258	15	9349	5220
1964	109	126000	6077	3834	2207	0	10756	16	9944	6090
1965	109	139000	6685	4107	2500	0	11906	18	10917	7964
1966	109	142000	7304	4402	2746	88990	13814	30	11709	9630

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966. King's Printer, Annual Report of the Superintendent of Education, Prince Edward Island, 1930-39.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix I, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual, 1950-67.

TABLE XLI

ANNUAL DATA FOR THE PROVINCE OF NOVA SCOTIA: 1930-66

(x 1000)

Year	Population	Personal disposable income	Educational expenditures	Provincial grants	Property tax revenues	Assessed real property value	Federal grants	Natural resource revenues	Sales tax revenues	Direct tax revenues
	1	1	2	2	2	3	4	4	4	4
	$	$	$	$	$	$	$	$	$	$
1930	514	157000	4101	445	2529	138202	1978	777	2809	1802
1931	513	134000	4252	500	2658	140107	2620	697	3408	1785
1932	519	108000	4261	545	2698	141006	2078	505	3030	1736
1933	525	104000	4267	573	2631	139323	2769	528	2799	1559
1934	531	115000	4267	613	2644	137808	3488	644	3161	1846
1935	536	125000	4235	631	2604	137173	4548	834	3776	1926
1936	543	136000	4276	648	2557	137076	4962	748	4447	2349
1937	549	155000	4364	663	2591	186325	4464	834	5236	2140
1938	555	155000	4400	688	2651	184420	4414	855	5708	2536
1939	561	159000	4663	719	2863	163037	4111	974	6168	2376
1940	569	186000	4697	756	2900	141655	4151	943	8001	1999
1941	578	219000	4240	831	2979	145204	4557	921	9543	2190
1942	591	267000	4646	1040	3066	144396	3540	919	10727	3385
1943	606	306000	4943	1116	3291	146796	3653	836	11310	3150
1944	611	329000	5354	1483	3326	148032	4310	795	12641	3549
1945	619	351000	6113	2109	3470	152778	4326	776	14046	3989
1946	608	386000	6707	2553	3633	157154	4902	739	16769	4342
1947	615	397000	7815	3297	3989	163793	6602	722	19397	11658
1948	625	394000	9106	4389	4418	172646	7847	1011	14003	10994

TABLE XLI (continued)

Year	Population 1	Personal disposable income 1 $	Educational expenditures 2 $	Provincial grants 2 $	Property tax revenues 2 $	Assessed real property value 3 $	Federal grants 4 $	Natural resource revenues 4 $	Sales tax revenues 4 $	Direct tax revenues 4 $
1949	629	419000	11562	6160	4887	179426	10105	1081	18384	11672
1950	638	445000	12077	6103	5457	196568	10513	1040	18394	13036
1951	643	478000	12825	6599	5709	223084	9657	1125	20139	13248
1952	653	525000	14290	6919	6853	240575	5999	1242	22749	17082
1953	663	557000	14709	6343	8561	253698	5317	1303	24372	19295
1954	673	574000	16527	7019	9592	271199	6094	1331	25428	20335
1955	683	598000	17411	7399	10724	302684	6776	1542	28040	20118
1956	695	656000	21342	10749	11383	454412	7650	1628	29490	21821
1957	702	680000	25372	12300	13216	490747	9101	1405	32206	25503
1958	710	725000	27323	12567	14329	555212	15465	1296	34952	27259
1959	716	774000	31550	14038	15878	694023	28953	1419	42764	30914
1960	727	793000	35536	15859	19145	770713	32281	1425	46249	32265
1961	737	832000	38940	16863	20960	849592	33890	1369	53847	32395
1962	746	879000	44410	20365	23651	919263	40077	1400	58368	36097
1963	751	923000	46778	21299	24740	971135	41662	1420	59581	36710
1964	755	973000	51142	23489	26605	1043924	45906	1489	63265	44136
1965	756	1064000	54679	25860	28451	1096220	53189	1596	69565	56672
1966	757	1129000	60035	27706	31343	1220325	77019	1620	75179	68042

Sources

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966. King's Printer, Annual Report of the Superintendent for Education for Nova Scotia, 1949.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

TABLE XLII

ANNUAL DATA FOR THE PROVINCE OF NEW BRUNSWICK: 1930-66

(x 1000)

Year	Population 1	Personal disposable income 1 $	Educational expenditures 2 $	Provincial grants 2 $	Property tax revenues 2 $	Assessed real property value 3	Federal grants 4 $	Natural resource revenues 4 $	Sales tax revenues 4 $	Direct tax revenues 4 $
1930	400	111000	3008	450	2406	126465	1654	853	3222	856
1931	402	92000	3137	367	2468	130053	2011	686	2951	828
1932	414	74000	3034	430	2389	127865	1763	516	2650	974
1933	419	70000	2882	413	2250	124634	1884	594	2294	848
1934	423	76000	2569	426	1922	126367	1886	759	2407	898
1935	428	82000	2607	446	1939	123571	2741	675	2708	1100
1936	433	90000	2650	462	1964	117976	2995	799	3169	1202
1937	437	102000	2906	505	2077	123329	3479	1069	3923	1083
1938	442	101000	2990	520	0	117508	3699	947	4457	1364
1939	447	107000	3172	534	2410	0	4016	863	5030	1495
1940	452	122000	3203	552	2426	113555	3522	1234	5741	1673
1941	457	139000	3160	558	2379	114993	3478	1309	6819	2030
1942	464	169000	3342	583	2523	119978	3254	1359	7074	4243
1943	463	191000	3417	528	2568	121699	3405	1384	7262	3896
1944	461	204000	3632	776	2602	127221	3718	1426	8216	4192
1945	467	233000	4162	1037	2867	146980	3670	1508	9824	4441
1946	478	264000	4025	1235	3341	172432	4796	1723	13269	5566
1947	488	275000	4660	1549	3125	202428	5769	2165	15122	10071
1948	498	293000	7563	2202	4719	216748	6502	2314	16153	8639

TABLE XLIII (continued)

Year	Population (1)	Personal disposable Income (1) $	Educational expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1949	508	314000	9645	4157	5251	232968	7894	2242	16218	9403
1950	512	336000	11464	4803	6434	241705	8358	1874	17956	10533
1951	516	366000	13889	6274	7615	277823	8871	2868	22419	11400
1952	526	384000	14910	6622	8288	304672	6521	3266	25250	14224
1953	533	390000	16394	6950	9066	308456	6671	3390	26502	16033
1954	540	410000	16597	6946	9581	318433	6325	3150	26762	17059
1955	547	432000	15545	6776	10407	331987	6723	3323	29073	16965
1956	555	479000	18655	7075	11756	344096	9414	4070	31526	17748
1957	565	484000	20867	7712	13453	359101	13226	4131	32644	20626
1958	577	504000	22407	6829	14797	415189	22911	3695	34211	22212
1959	590	544000	25373	8508	16211	442019	25914	3628	36091	25515
1960	598	574000	28082	9139	17830	512678	31605	3732	42832	26871
1961	605	597000	30163	9350	19567	543447	33320	3866	43491	26628
1962	609	633000	32895	12035	22482	567035	37936	3689	44037	27471
1963	611	664000	36625	11348	25015	600324	41525	3759	46649	28480
1964	615	726000	38140	10940	27062	725493	49249	4163	50929	35294
1965	615	812000	40926	10020	31177	860748	55007	4812	56359	47134
1966	617	877000	44704	10176	33568	1060770	57509	4718	62674	62973

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

TABLE XLIII

ANNUAL DATA FOR THE PROVINCE OF QUEBEC: 1930-66

(x 1000)

Year	Population [1]	Personal disposable income [1]	Educational expenditures [2]	Provincial grants [2]	Property tax revenues [2]	Assessed real property value [3]	Federal grants [4]	Natural resource revenues [4]	Sales tax revenues [4]	Direct tax revenues [4]
1930	2825	1082000	26217	1468	17613	2451644	2620	5768	25185	10921
1931	2874	938000	28409	1429	18697	2210943	5282	4917	22445	4493
1932	2925	770000	27694	1269	18215	2226144	8144	3580	20450	7590
1933	2972	714000	24701	1447	19028	2192447	7906	3118	18214	7579
1934	3016	797000	22793	1219	19392	2183369	10612	3584	18146	8175
1935	3057	836000	24019	1158	19002	2173591	12223	4801	20249	10153
1936	3099	900000	23028	1318	18395	2140101	13097	5390	23114	10669
1937	3141	1000000	23528	1301	17753	2130452	17007	5245	25792	12435
1938	3183	999000	25556	2170	18776	2144043	17164	6885	24531	20276
1939	3230	1048000	26703	2377	19029	2129594	14826	6956	31204	20220
1940	3278	1173000	27239	2443	21179	2199931	12487	6703	31053	19420
1941	3332	1387000	27601	2711	22098	2222325	14726	9067	46392	27312
1942	3390	1611000	29608	3399	23381	2262977	14130	11442	53001	29513
1943	3457	1794000	31335	5545	23379	2299971	14944	10540	56143	28157
1944	3500	1868000	33846	6768	23555	2342017	15635	11051	60976	26517
1945	3560	1970000	38907	6573	25478	2436210	15690	12426	71607	26851
1946	3629	2141000	42523	6312	27294	2581117	17218	17197	91948	31062
1947	3710	2410000	47622	15734	28124	2720024	22039	16211	104245	55148
1948	3788	2754000	52721	9978	31649	2870933	23043	17072	121675	59514

TABLE XLIII (continued)

Year	Population (1)	Personal disposable income (1) $	Educational expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1949	3882	2976000	57820	11058	35113	3060925	28359	15258	124741	55809
1950	3969	3153000	62918	17202	46832	3250913	36580	17936	139501	65084
1951	4056	3535000	68904	15910	50580	3667165	35215	25246	150123	78130
1952	4174	3861000	82297	20735	57507	3868454	24472	25942	170245	76947
1953	4269	4150000	95628	25004	64978	4090775	23773	25203	184509	76506
1954	4388	4331000	105459	29454	71089	4726504	24579	27362	194136	85782
1955	4517	4557000	120673	34427	82402	4890300	26314	32130	214247	120288
1956	4628	5013000	146739	41048	93478	5897377	27586	35490	239150	133091
1957	4758	5231000	169830	48659	106655	6449193	29323	34076	275140	171035
1958	4884	5663000	195045	56042	122191	7167283	30326	30736	260192	200930
1959	4999	5952000	223077	63936	144046	8112710	31337	30570	293449	226914
1960	5142	6213000	257582	76838	162446	8773072	71815	34297	306543	247691
1961	5359	6689000	307627	114725	160235	0	153574	34964	360985	290452
1962	5371	7159000	361551	169277	154984	0	210027	35420	428533	315250
1963	5481	7558000	414360	197678	190358	0	237199	43035	480065	356503
1964	5584	8140000	500000	268508	219000	0	231358	41296	605628	468813
1965	5685	9099000	552000	291292	283600	0	169185	41116	719421	701152
1966	5781	9871000	675756	342014	311743	0	136490	46276	780338	878621

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

TABLE XLIV

ANNUAL DATA FOR THE PROVINCE OF ONTARIO: 1930-66

(x 1000)

Year	Population	Personal disposable income	Educational expenditures	Provincial grants	Property tax revenues	Assessed real property value	Federal grants	Natural resource revenues	Sales tax revenues	Direct tax revenues
	1	1	2	2	2	3	4	4	4	4
		$	$	$	$	$	$	$	$	$
1930	3326	1746000	54041	5401	39203	2751117	6167	4074	2498	14310
1931	3432	1503000	50706	6277	33544	2811763	14595	4347	3141	15273
1932	3473	1225000	47621	6090	37217	2839753	10478	3642	3156	14185
1933	3512	1150000	42030	5240	35476	2817352	21198	2721	3096	15031
1934	3544	1287000	45567	5010	35386	2702601	25066	2727	3155	14307
1935	3575	1363000	44001	4719	33548	2685249	26719	3734	3032	15019
1936	3606	1424000	48168	4837	35931	2679133	27042	4494	4172	29609
1937	3637	1603000	49018	5645	37412	2677749	23095	5175	4171	35563
1938	3672	1619000	52490	6722	38559	2682901	26892	5257	4370	2030781
1939	3708	1793000	53451	7015	39567	2699081	23058	4231	48242	33346
1940	3747	1976000	54270	6974	39952	2716462	19222	7063	51175	34190
1941	3788	2355110	55605	7648	41140	2724190	16772	7195	54377	41254
1942	3834	2726000	56774	7830	41254	2747522	19139	8967	55333	40064
1943	3915	2976000	58741	8276	42303	2774973	23265	8770	55713	42283
1944	3963	3110000	60134	8095	43791	2796478	25263	8071	56376	43230
1945	4000	3344000	62352	20022	36799	2836780	23285	9646	72059	41886
1946	4093	3382000	67707	29289	36334	2890673	22677	10168	60129	45035
1947	4176	3661000	77020	30204	41446	3030283	24294	10752	109726	62518
1948	4275	4202000	88629	32707	50350	3099126	25952	11011	126342	83995

TABLE XLIV (continued)

Year	Population [1]	Personal disposable income [1] $	Educational expenditures [2] $	Provincial grants [2] $	Property tax revenues [2] $	Assessed real property value [3] $	Federal grants [4] $	Natural resources revenues [4] $	Sales tax revenues [4] $	Direct tax revenues [4] $
1949	4378	4557000	100081	37591	57930	3541093	34856	12962	133514	80204
1950	4471	4549000	113021	42661	69020	3724238	39927	14928	154156	91785
1951	4598	5621000	136420	47355	87420	3983874	42255	18877	157529	111945
1952	4788	6144000	157588	53969	101381	4253112	29390	23742	167000	148804
1953	4941	6550000	171434	57881	111097	4474094	23122	22826	177571	157698
1954	5115	6729000	193185	67018	140221	5434372	26728	22791	189694	166310
1955	5266	7279000	226650	73650	140466	5841744	28439	25932	215648	166410
1956	5405	7918000	250561	80243	164295	6394668	29790	28725	234772	185056
1957	5622	8536000	284651	93182	168722	7047527	38878	32226	278559	231063
1958	5803	9174000	327893	129552	197656	7276865	56386	32012	305119	266158
1959	5952	9700000	386336	150157	240149	7710919	123651	35985	380731	295225
1960	6111	9908030	434411	160751	267641	8376297	159817	42356	424411	318751
1961	6236	10312010	478818	181546	294049	8777573	185896	43321	508118	315177
1962	6351	10992020	523943	204548	316948	9549675	290082	43375	619679	353132
1963	6481	11759100	583278	233989	345371	10048314	295726	40640	634742	406387
1964	6631	12462000	672310	293316	368747	10551553	266478	42071	766036	475114
1965	6788	13587000	756381	332034	395985	10996832	301878	44973	875596	588491
1966	6961	14903000	860260	376571	462401	11410697	370779	42569	1083295	649553

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966. King's Printer, Report of the Minister of Education, Province of Ontario for the year 1945.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

TABLE XLV

ANNUAL DATA FOR THE PROVINCE OF MANITOBA: 1930-66

(x 1000)

Year	Population (1)	Personal disposable income (1) $	Educational expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1930	699	284000	9674	1286	7622	541847	2447	254	4092	4140
1931	700	218000	9167	1311	7676	539012	4506	337	4867	2922
1932	705	190000	7983	1300	6825	536414	5983	346	4357	3506
1933	708	169000	7087	1209	6029	502768	5309	501	4172	4839
1934	709	190700	6127	1125	5493	495428	5021	667	4415	5219
1935	710	193000	6503	1043	6017	471645	6470	718	4663	5257
1936	711	209090	6660	988	5635	461402	8127	826	5132	5586
1937	715	267000	6893	972	6092	455012	8219	695	5852	5768
1938	720	235030	7156	1129	7890	446106	7603	636	5998	5393
1939	726	244030	7284	1173	6851	434863	7054	620	5736	5294
1940	728	280330	7295	1153	6561	423620	6514	816	6737	5554
1941	730	330000	7454	1247	6700	423261	5527	979	8016	5742
1942	724	400000	7885	1242	6568	425124	4554	942	8642	6075
1943	723	423000	8429	1358	7151	426645	4606	1038	9218	6089
1944	727	456000	9050	1542	7752	423937	4425	1243	9873	6245
1945	727	475000	10614	1573	7947	434657	4497	1373	11514	6418
1946	727	551000	11074	1545	9698	445388	5269	1464	13107	5231
1947	739	574000	12416	2752	9552	459440	5999	1624	15738	11356
1948	746	690000	14195	3623	9658	497463	6464	2039	17353	13549

TABLE XLV (continued)

Year	Population (1)	Personal disposable income (1) $	Educational expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1949	757	649000	16541	4207	11442	545455	8321	2044	17563	14333
1950	763	716000	17376	4037	12875	567471	18657	2335	18499	15974
1951	776	834000	18928	4348	13967	588596	12343	2759	20175	17559
1952	798	876000	20817	4123	15673	615894	6888	2762	21048	24020
1953	809	801000	22521	6741	15849	643645	7081	2871	23540	26107
1954	823	864030	25399	8303	17702	671876	7534	3216	23939	26191
1955	839	931000	28583	8578	19251	732018	7483	4062	25392	25799
1956	850	1036000	30481	8429	21405	823567	9202	4437	23536	27336
1957	860	1054000	34382	10093	23472	885557	10998	4579	32065	31236
1958	870	1182000	36612	13190	24400	970597	15485	3903	34435	33271
1959	885	1242000	47344	20244	27935	1019009	23414	3672	47730	37985
1960	906	1285000	54740	24776	30899	1061653	27641	4092	54430	39922
1961	922	1273000	60436	25186	35674	1147265	30665	4145	65324	40326
1962	936	1447000	64555	27301	38104	1239945	35146	4538	65956	52030
1963	949	1464000	69545	28527	41389	1276644	42605	5664	70358	54252
1964	959	1569000	74239	30132	43836	1368098	49277	5771	80442	63510
1965	965	1694000	80774	32645	48039	1460723	52554	7002	95608	80527
1966	963	1813000	89444	35119	55549	1493492	74108	6435	105490	95561

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966. King's Printer, Report of the Department of Education for the Year Ending June 30, 1949, Winnipeg.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

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TABLE XLVI

ANNUAL DATA FOR THE PROVINCE OF SASKATCHEWAN: 1930-66

(x 1000)

Year	Population 1	Personal disposable income $ 1	Education expenditures $ 2	Provincial grants $ 2	Property tax revenues $ 2	Assessed real property value $ 3	Federal grants $ 4	Natural resources revenues $ 4	Sales tax revenues $ 4	Direct tax revenues $ 4
1930	903	234000	15260	2764	10671	1041299	2979	334	6011	2965
1931	922	142000	11433	2398	8115	1089730	8642	546	4896	2290
1932	924	145000	8508	1919	6871	1099167	10672	521	4452	2991
1933	926	113000	7365	1597	5959	1076520	7494	497	4621	3261
1934	928	141000	6918	1594	5800	1067714	4762	556	4587	2864
1935	930	179000	7348	1614	6075	1058009	11206	652	5071	3440
1936	931	175000	7544	1638	6095	1049146	13769	708	5975	3678
1937	922	146000	6819	1750	5050	1030218	28357	773	5804	3048
1938	914	195000	7283	2311	5369	1018761	20249	827	7991	3226
1939	906	264000	8077	2305	7255	985975	11384	835	8986	3439
1940	900	274000	8502	2519	7256	953190	9112	953	10653	3802
1941	896	266000	10694	2611	7579	918152	6070	1232	13274	5690
1942	848	535000	10940	2713	8399	892108	4799	1508	13148	7666
1943	838	415000	12646	2098	11013	859872	5270	1934	14710	9102
1944	830	637000	13607	2862	12636	817076	5474	2149	16550	9072
1945	833	504000	13562	3191	10786	809500	5591	2289	19452	9109
1946	833	616000	15684	3844	11625	809284	5851	2253	22020	8776
1947	836	603000	18392	4920	12568	833639	6422	2469	29210	14041
1948	838	744000	20052	6053	14556	856568	7304	2788	32740	16067

TABLE XLVI (continued)

Year [1]	Population [1]	Personal disposable income [1] $	Education expenditures [2] $	Provincial grants [2] $	Property tax revenues [2] $	Assessed real property value [3] $	Federal grants [4] $	Natural resource revenues [4] $	Sales tax revenues [4] $	Direct tax revenues [4] $
1949	832	760000	22849	5425	15752	851347	9025	3187	37623	16857
1950	833	678000	25110	6919	16372	860977	9963	3343	34669	18555
1951	832	1064000	26263	7466	17751	881912	10117	4306	43007	20048
1952	843	1150000	29276	8722	21064	892296	7856	6243	49336	25529
1953	861	1073000	33466	8532	23076	916098	7607	9363	55329	25982
1954	873	752000	36816	10286	23284	938322	8332	9983	57769	26449
1955	878	946000	39472	11594	25146	963425	8767	12795	57909	26217
1956	881	1146000	42762	12993	29707	989530	9586	21290	62939	27127
1957	879	949000	48045	14637	32270	1025689	10822	25484	69290	31707
1958	888	1037000	54904	18637	34013	1057473	16816	24470	75278	33990
1959	902	1108000	62066	20579	35111	1130610	26423	20744	79472	38770
1960	915	1269000	70050	25443	38415	1176113	28980	20091	80750	40512
1961	925	1040000	75766	28965	40454	1253261	31160	20716	86767	40586
1962	930	1471000	74831	31285	43246	1292131	37781	26238	105048	46550
1963	933	1625000	81782	33300	46156	1351427	42352	31228	120921	50096
1964	942	1456000	88801	37449	49150	1404114	43420	35581	123939	57215
1965	950	1722000	99771	42015	53795	1452676	47930	42477	126968	73925
1966	955	1972000	112661	47724	61771	1514977	57649	41776	137235	86594

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual, 1950-67.

TABLE XLVII

ANNUAL DATA FOR THE PROVINCE OF ALBERTA: 1930-66

(x 1000)

Year	Population	Personal disposable income	Education expenditures	Provincial grants	Property tax revenues	Assessed real property value	Federal grants	Natural resource revenues	Sales tax revenues	Direct tax revenues
	1	1	2	2	2	3	4	4	4	4
		$	$	$	$	$	$	$	$	$
1930	708	267000	11959	1594	8655	645417	2030	633	7283	2866
1931	732	156000	10362	1512	8935	579960	4125	939	5960	2381
1932	740	166000	9734	1675	8367	571120	5097	854	5723	3130
1933	750	142000	8696	1538	7074	567605	4401	931	5874	3066
1934	758	182000	8772	1445	7937	560409	4386	1124	6253	3226
1935	765	185000	8829	1432	7490	501631	4700	1166	6667	3406
1936	773	186000	8910	1390	7542	501092	6296	1447	8221	3634
1937	776	251000	9474	1527	7734	570663	6943	1650	8619	4154
1938	781	267000	9848	1636	8088	570344	6336	1586	9541	4403
1939	786	259000	10215	1809	8188	513190	5580	1760	9016	4544
1940	790	306000	10826	1870	8684	455536	4774	2142	10353	5251
1941	796	312000	10773	1916	8050	530146	4613	2484	12643	5656
1942	776	490000	11228	2077	8833	534019	3989	2719	13662	5676
1943	785	419000	11642	2143	9672	539869	3844	2857	14510	6021
1944	808	543000	12890	2620	10304	530356	4341	3335	15371	6241
1945	808	521000	13983	3042	10856	549221	4646	3444	18006	9172
1946	803	640000	15022	3232	11691	567537	4965	3291	21610	8677
1947	825	648000	18403	5275	13240	617352	5969	4043	24974	12426
1948	854	832000	22323	6480	15548	640659	6850	13477	28471	14682

TABLE XLVII (continued)

Year	Population (1)	Personal disposable income (1)	Education expenditures (2)	Provincial grants (2)	Property tax revenues (2)	Assessed real property value (3)	Federal grants (4)	Natural resource revenues (4)	Sales tax revenues (4)	Direct tax revenues (4)
		$	$	$	$	$	$	$	$	$
1949	885	838000	25743	6446	17782	649097	8398	32376	30569	15255
1950	913	874000	28166	7794	19613	736603	10128	46270	32615	16976
1951	939	1166000	31456	9717	21880	803412	11747	46082	35381	18745
1952	973	1241000	36096	10958	25214	895567	9613	59037	40721	29077
1953	1012	1280000	40499	12634	28136	1026516	10871	93174	45061	30461
1954	1057	1217000	47656	15860	31234	1063331	10812	91767	47117	31322
1955	1091	1309000	51832	24930	25904	1147348	10429	122524	50291	31654
1956	1123	1486000	57768	26742	30375	1240703	10740	138475	53591	35866
1957	1160	1530000	73088	40594	35678	1316770	13819	134049	59332	42059
1958	1201	1727000	91531	42810	41092	1387033	22571	121704	61105	45667
1959	1243	1820000	100125	50830	46671	1505208	31479	142321	62326	53115
1960	1291	1856000	112107	56118	54354	1657681	35302	121445	65132	56705
1961	1332	1963000	122910	63547	52445	1809286	41356	121937	73511	58077
1962	1369	2155000	145896	75483	67779	2085211	63432	128769	82414	62703
1963	1403	2272000	150019	76208	71036	2149276	76014	151146	85354	62264
1964	1429	2358000	150906	70425	76243	2224496	71135	149382	87911	63034
1965	1450	2662000	164897	78470	82238	2584303	77876	246316	94540	76491
1966	1463	3007000	184837	87534	94265	2716343	96958	251456	103607	98031

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues and Expenditures, Actual 1950-67.

TABLE XLVIII

ANNUAL DATA FOR THE PROVINCE OF BRITISH COLUMBIA: 1930-66

(x 1000)

Year	Population 1	Personal disposable income $ 1	Education expenditures $ 2	Provincial grants $ 2	Property tax revenues $ 2	Assessed real property value $ 3	Federal grants $ 4	Natural resource revenues $ 4	Sales tax revenues $ 4	Direct tax revenues $ 4
1930	676	365000	9532	2719	6265	614900	1558	4218	9764	9370
1931	694	313000	9394	2856	6227	688096	4398	3576	8431	8760
1932	707	260000	8864	3089	5704	677356	5910	2902	7743	8915
1933	717	247000	8148	2302	6092	640462	5707	2779	7832	8061
1934	727	269000	7908	2054	5601	625762	6183	3229	8291	8760
1935	736	290000	8154	2176	5623	583756	5790	3760	9279	9877
1936	745	315000	8704	2270	5803	452684	6654	4075	10556	10767
1937	759	352000	9448	2456	6316	440372	6771	4345	11374	12071
1938	775	363000	9945	2614	6668	444523	6453	4069	11826	11514
1939	792	375000	10052	2723	7009	415763	6134	4053	11756	11056
1940	805	421000	10214	2636	6936	383003	5815	5195	13991	12465
1941	818	436000	10059	3001	7019	384627	4725	6336	16019	14579
1942	870	599000	10171	3035	7092	392276	4012	6342	17517	14570
1943	900	673000	10570	2976	7578	390263	4903	6254	17159	14984
1944	932	695000	11173	3173	7926	407462	5166	6464	17279	15579
1945	949	749020	12468	3784	8660	420156	5171	7052	20245	15561
1946	1003	835000	13316	4076	8494	448357	5615	5054	35887	17069
1947	1044	929000	16124	6570	9924	437630	6722	4862	42614	21587
1948	1082	1112000	20154	8677	11706	520715	13263	4943	64228	24668

TABLE XLVIII (continued)

Year	Population (1)	Personal disposable Income (1) $	Education expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1949	1113	1183000	28920	13450	14452	573460	16329	6267	76410	27057
1950	1137	1309030	32512	14794	16634	622442	15050	6502	84763	30669
1951	1165	1438000	42198	18198	22296	658828	16978	7503	93769	33903
1952	1205	1571000	45428	17667	25811	712922	12674	21403	100437	45900
1953	1248	1674000	48277	15754	30341	771130	11710	26187	104083	48147
1954	1295	1745030	50611	17032	35159	842093	12043	27565	110301	50296
1955	1342	1595500	61899	33992	25614	1044040	14411	36083	126971	50767
1956	1399	2073000	68841	35571	27794	1238393	14171	44330	145292	58684
1957	1487	2306300	80535	39446	36706	1415936	27508	43135	161968	64062
1958	1544	2417000	90746	42217	45123	1562992	41019	44105	163275	69427
1959	1570	2561000	104410	48576	53226	1721747	53730	52571	172166	72410
1960	1602	2600000	117534	55043	59494	1843967	64525	54543	165882	77859
1961	1629	2628030	126004	58334	64102	1920101	71637	59073	185310	80011
1962	1660	2859000	135430	62600	69092	2142411	79077	65778	203506	78991
1963	1699	3040300	149045	68698	77692	2224806	85539	75561	217508	85925
1964	1745	3277000	164715	71718	84286	2294698	85075	90734	241928	102711
1965	1797	3685000	185334	77500	101807	2365847	97731	100185	277510	140041
1966	1874	4101000	211593	87296	118192	2549447	104358	103288	305088	183496

Sources:

Data derived from:

1) Dominion Bureau of Statistics, National Accounts: Income and Expenditures, 1929-60, 1962, 1967.

2) Dominion Bureau of Statistics, Elementary and Secondary Education in Canada, 1929-40; Survey of Elementary and Secondary Education, 1941-46; Survey of Education Finance, 1947-1965; Preliminary Statistics of Education, 1966. King's Printer, Public Schools of the Province of British Columbia, 26th Annual Report, 1946-47.

3) Dominion Bureau of Statistics, Canada Year Book, 1930-40; Financial Statistics of Municipal Governments in Canada, 1944-46; Financial Statistics of Municipal Governments, Revenue and Expenditures, Assets and Debt, Actual, 1949-66.

4) King's Printer, Royal Commission on Dominion-Provincial Relations, Dominion of Canada and Provincial Governments Comparative Statistics, Appendix 1, 1930-1939; Dominion Bureau of Statistics, Financial Statistics of Provincial Governments of Canada, 1940-52; Financial Statistics of Provincial Governments, Revenues, and Expenditures, Actual 1950-67.

TABLE XLIX

ANNUAL DATA FOR CANADA: 1930-66

(x 1000)

Year	Population (1)	Personal disposable income (1) $	Education expenditures (2) $	Provincial grants (2) $	Property tax revenues (2) $	Assessed real property value (3) $	Federal grants (4) $	Natural resource revenues (4) $	Sales tax revenues (4) $	Direct tax revenues (4) $
1930	10195	2767000	134930	16576	93553	8467909	22027	17540	62718	47490
1931	10363	3552000	127308	16969	94509	8222260	47179	16045	50837	44153
1932	10496	2951000	118180	16580	88514	8241505	59722	13223	51440	43183
1933	10619	2721000	105623	14673	84722	8099943	57742	11671	49223	44514
1934	10727	3070000	105351	13748	84393	7933246	67456	13349	50425	45501
1935	10829	3268000	107044	13484	82522	7768650	75515	16409	56486	54493
1936	10934	3452000	110464	13825	84187	7574742	84073	18487	65303	67251
1937	11029	3995000	113700	15008	85210	7040425	105335	20386	72011	71158
1938	11136	3953000	120150	18061	88544	7647777	93900	21062	79019	2080047
1939	11250	4178000	124047	18929	93547	7342103	77183	20193	126560	82195
1940	11364	4799000	126683	19172	96047	7388341	66524	25075	138329	89942
1941	11493	5516000	130158	20789	97120	7473826	61113	30113	172752	105310
1942	11637	6323000	135051	22202	101713	7528861	58671	34239	179906	112385
1943	11778	7229000	142275	25001	106162	7577684	65018	33615	187080	114738
1944	11929	7476000	150203	28530	111770	7014707	69573	34530	199498	115566
1945	12055	8127000	162735	44249	107114	7797605	68207	38956	239909	118294
1946	12268	8863000	177560	52435	112853	8062972	72066	41941	305707	127594
1947	12527	9579000	203577	70665	122534	8312421	84904	42206	367170	220866
1948	12799	11072000	235727	74656	143013	8395431	93060	54665	428751	233953

TABLE XLIX (continued)

	1	1	2	2	2	3	4	4	4	4
Year	Population	Personal disposable income $	Education expenditures $	Provincial grants $	Property tax revenues $	Assessed real property value $	Federal grants $	Natural resource revenues $	Sales tax revenues $	Direct tax revenues $
1949	13423	11343000	273492	92036	162047	9687484	125021	75425	459101	235560
1950	13688	12632000	303333	103388	193782	10220109	163674	94650	512640	272212
1951	13984	14757000	356875	120087	227757	11008233	162513	109564	558007	315227
1952	14434	16027000	407312	135536	262392	11811310	1158846	144457	610432	396157
1953	14820	16956000	453078	146172	291787	12510246	107050	154915	654193	415090
1954	15260	16934330	500601	169785	329275	14292491	115048	187290	652006	440552
1955	15669	18274000	574884	209740	342128	15241472	121570	238786	766027	474457
1956	16250	20168330	648882	232190	393469	17406290	134341	260069	850062	523449
1957	16558	21204000	755320	285732	451262	19019110	165394	280419	963314	636633
1958	17015	22841000	862292	343439	495547	20427030	268090	263510	1012173	719638
1959	17408	24148000	958061	396158	581705	22391073	408135	292095	1140295	804846
1960	17834	24971000	1130682	444562	651609	24234152	456542	283391	1210993	805624
1961	18301	25966000	1263342	519649	689403	16300525	626558	291448	1414304	898613
1962	18543	28125000	1407253	624467	738124	17834741	352427	310608	1647412	946662
1963	18890	29895330	1564089	697044	824309	18642486	929273	353768	1816381	1104425
1964	19243	31569000	1770246	837485	901591	19610846	969826	421206	2070146	1343451
1965	19603	35011000	2007547	917407	1034209	20817199	937864	491269	2372779	1809065
1966	19973	38433000	2283649	1043684	1177247	22055446	1059637	502621	2716919	2217252

APPENDIX B

ESTIMATES OF THE MARKET

VALUE OF REAL PROPERTY

IN CANADA

TABLE L

ESTIMATED MARKET VALUE OF REAL PROPERTY IN

CANADA FOR YEARS 1930 TO 1966, INCLUSIVE

(In Millions of Dollars)

Year	Agricultural real property	Residential real property	Industrial real property
1930	5075	3833	9484
1931	4699	3621	8918
1932	3291	3306	8442
1933	3376	3134	7993
1934	3508	3233	7856
1935	3662	3230	7867
1936	3554	3341	7945
1937	3635	3630	8577
1938	3272	3587	8431
1939	3371	3670	8304
1940	3321	3961	8823
1941	3030	4443	9680
1942	3238	4832	10566
1943	3454	5226	11164
1944	3649	5519	11195
1945	3711	5720	11177
1946	3897	6294	12084
1947	4214	7367	14301
1948	4665	9016	17177
1949	4714	9933	19217
1950	5023	11086	21560
1951	5513	13502	25859
1952	5668	14384	29022
1953	6296	15328	31971
1954	6183	16157	33753
1955	6567	17354	36282
1956	6853	18952	41408
1957	6958	20276	44682
1958	7441	21882	47064
1959	7842	23576	49201
1960	8227	25062	51212
1961	8603	25977	52945
1962	8974	26724	54675
1963	9639	27571	56744
1964	10675	28695	59830
1965	12039	29882	64110
1966	13467	31078	69862

Sources: N.H. Lithwick, Economic Growth in Canada, Toronto: University of Toronto Press, 1967.

Dominion Bureau of Statistics: National Accounts, Income and Expenditures.